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ALTERING POSITIVE/NEGATIVE INTERACTION RATIOS IN  
RELATIONSHIPS OF MOTHERS AND YOUNG CHILDREN:  
A PRELIMINARY INVESTIGATION

by

Andrew B. Armstrong

A thesis submitted in partial fulfillment  
of the requirements for the degree

of

EDUCATIONAL SPECIALIST

in

Psychology

Approved:

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UTAH STATE UNIVERSITY  
Logan, Utah

2008

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## ABSTRACT

Altering Positive/Negative Interaction Ratios in  
Relationships of Mothers and Young Children:  
A Preliminary Investigation

by

Andrew B. Armstrong, Educational Specialist

Utah State University, 2008

Major Professor: Dr. Clinton E. Field  
Department: Psychology

Based on classic marital research of John Gottman, a popular notion exists that interpersonal relationships thrive when the number of positive interactions outweighs negative interactions by a ratio of five to one. Though many have given similar advice for parents and caregivers, Gottman's findings and methodology may not generalize to relationships of parents and young children. Were similar ratio findings to be validated for parent-child relationships, explicit ratio advice may be incorporated as a component of clinical practice (e.g., behavioral parent training). To begin investigating potential clinical implications, a project was conducted that examined mothers' ability to achieve prescribed ratios following brief instruction. Baseline ratio levels for a small sample of nonclinical mother-child dyads were approximately one positive for every one negative. When instructed to attain a 5 to 1 ratio, all participants improved their ratios; half the

sample achieved the target ratio. Mothers in the study altered their ratios primarily by boosting the number of positives they used with their children.

(104 pages)

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Andrew B. Armstrong

## CONTENTS

	Page
ABSTRACT.....	iii
ACKNOWLEDGMENTS .....	v
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
INTRODUCTION .....	1
REVIEW OF LITERATURE .....	5
Basis for Ratio Advice.....	5
Marital Research .....	5
Theoretical Support of Ratio Concept .....	8
Implications of Marital Research for Mother-Child Relationships.....	12
Ratio Manipulations as Interventions .....	13
Parental Ability to Achieve Prescribed Ratios.....	13
Baseline Ratio Behavior of Parents .....	18
Observed Impact of Ratio Training .....	22
Social Validity .....	27
Summary of Research Findings .....	29
Limits of Knowledge .....	30
METHOD .....	33
Population and Sample .....	33
Setting.....	35
Design.....	35
Procedure .....	36
Measures.....	37
Interobserver Reliability .....	38

RESULTS .....	41
Observational Data .....	41
DISCUSSION .....	55
Baseline Ratios .....	55
Effectiveness of Brief Ratio Training .....	56
Mothers' Manipulation of Positives and Negatives .....	58
Limitations .....	59
Future Directions .....	62
CONCLUSION .....	64
REFERENCES .....	65
APPENDICES .....	74
Appendix A: Brief Ratio Instruction Script .....	75
Appendix B: Brief Ratio Instruction Plus Modeling, Role Play, and Feedback.....	77
Appendix C: Instructions to Mothers Prior to Entering Observation Room.....	80
Appendix D: Instructions to Children Upon Entering Observation Room .....	82
Appendix E: Debriefing Script.....	84
Appendix F: Coding System for Parent Behaviors .....	86
Appendix G: Informed Consent Form.....	90
Appendix H: Recruiting Flyer .....	93



## LIST OF TABLES

Table		Page
1	Demographic Data .....	34
2	Mean Frequency and Percentage Agreement of Each Code Type.....	40
3	Changes in Number of Positives from Pre- to Postinstruction Phases .....	46
4	Changes in Number of Negatives from Pre- to Postinstruction Phases .....	47
5	Changes in Ratios from Pre- to Postinstruction .....	48

## LIST OF FIGURES

Figure		Page
1	Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant A1 .....	42
2	Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant A2 .....	42
3	Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant A3 .....	43
4	Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant A4 .....	43
5	Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant B1 .....	44
6	Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant B2 .....	44
7	Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant B3 .....	45
8	Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant B4 .....	45
9	Positives during pre- and postinstruction phases: Group means .....	47
10	Negatives during pre- and postinstruction phases: Group means .....	48
11	Ratios during pre- and postinstruction phases: Group means .....	49
12	Total maternal behaviors per specific positive and negative codes during pre-and postinstruction phases for participant A1 .....	50
13	Total maternal behaviors per specific positive and negative codes during pre-and postinstruction phases for participant A2 .....	51
14	Total maternal behaviors per specific positive and negative codes during pre-and postinstruction phases for participant A3 .....	51

Figure	Page
15	Total maternal behaviors per specific positive and negative codes during pre-and postinstruction phases for participant A4.....52
16	Total maternal behaviors per specific positive and negative codes during pre-and postinstruction phases for participant B1.....52
17	Total maternal behaviors per specific positive and negative codes during pre-and postinstruction phases for participant B2.....53
18	Total maternal behaviors per specific positive and negative codes during pre-and postinstruction phases for participant B3.....53
19	Total maternal behaviors per specific positive and negative codes during pre-and postinstruction phases for participant B4.....54

## INTRODUCTION

That interpersonal relationships benefit from having significantly more positive than negative interactions is intuitive. The notion of developing interventions that manipulate or specifically target positive/negative interaction ratios to improve interpersonal relationships is appealing for several reasons. Advice to boost positives and minimize negatives possesses face validity, is easy to apply to many different types of interpersonal relationships (e.g., couples, businesses, parents, and educators), and instructions for modifying ratios are more straightforward than many of the recommendations made by mental health professionals, relationship experts, and authorities on organizational behavior. Also appealing is the fact that meaningful positive interactions can be created voluntarily to counteract necessary negative interactions.

The empirical literature regarding positive/negative ratios contains very few studies supporting ratio manipulations as effective intervention strategies (Field, Nash, Handwerk, & Friman, 2004; Friman, Jones, Smith, Daly, & Larzelere, 1997). Much of the extant ratio advice appears to target parents and caregivers seeking help with children who display challenging behaviors, yet evaluations of the effectiveness of such advice could not be found within the parent-child literature. Nonetheless, the idea of a “magic” interaction ratio remains widespread in lay literature, and is commonly taught as a method for modifying behavior in education, business, and family contexts (Flora, 2000). Several books and articles about marriage, parenting, education, and organizational behavior recommend boosting ratios, as the following examples demonstrate.

From a newsletter of Western Oregon University's Early Childhood Department:

Adults should provide frequent, accurate feedback to children about [children's] behavior. This feedback should be given individually and should reflect a ratio of 4 positive encouraging statements to 1 correction statement and/or consequence. This ensures that the majority of feedback provided to children is of a positive nature and creates an overall positive tone. (Udell, Deardorff, & Glasenapp, 1998, p. 1)

From a behavior modification textbook:

During an hour that you spend with children, how many times do you dispense social approval (nods, smiles, or kind words)? How many times do you dispense social disapproval (frowns, harsh words, etc.)? Ideally, your social approval total at the end of the hour will be four or five times the social disapproval total. We would encourage you to continue this exercise until you have achieved this ratio. (Martin & Pear, 1999, p. 43)

From a fact sheet on bullying:

Teachers and administrators should work to increase the number of positives directed toward children on a daily basis. The ratio, just as in the home, should be approximately 5 positives for each negative. Teachers must "catch them being good." The situation may occur where the teacher will have to "set up" a situation in order to give positives. (Batsche & Moore, 1992, p. 2)

Given the apparent dearth of empirical support for ratio advice, why is it so commonplace? Much of the reason may stem from the popularity and generalization of research findings within marital contexts, as well as the fact that the benefit of increasing positive interactions in the context of interpersonal relationships is generally considered to be self-evident. The assumption seems to have been made that "if it applies to one type of relationship, it must apply to others." Furthermore, though not *explicitly* tied to ratios, theoretical support for strategic, attention-based intervention strategies can be derived from behavioral therapy, social attachment theory, applied behavioral analysis, and data-based models of classroom management.

While the applicability of ratios in various contexts appears obvious, very little research has been conducted to validate this claim. The empirical data that do exist fail to establish ratio manipulations as interventions, and do not inform our understanding of ratios in the context of parenting. To date, ratio research has been primarily descriptive, not experimental, and has been performed with adult or adolescent samples. No studies have directly examined ratios as interventions in the context of relationships of mothers and young children.

Several key issues need to be addressed before ratio advice could be considered to have valid clinical implications for mother-child relationships, including:

1. *Can* parents achieve prescribed ratios?
2. What are naturally occurring ratios that characterize parent-child relationships?
3. Is behavior modified in a positive direction in response to a change in ratios?
4. Are ratio interventions socially valid?

The present ratio literature does not yet provide satisfactory answers to these questions. The current study initiated evaluation of ratio advice given to mothers and young children by first investigating the *practicality* of such advice. In short, prior to assessing the impact of ratio manipulation as a strategy for improving child behavior, that parents can attain prescribed interaction ratios should be established. Therefore, this study did not seek to establish that a special ratio maximizes outcomes in mother-child interactions, but rather it examined whether mothers were able to manipulate ratios in a specified direction and degree following a brief introduction to ratios in a laboratory

setting. Also of interest were the specific techniques mothers naturally used to alter their ratios (i.e., increasing positives, decreasing negatives, or some combination of each).

The following research questions were the focus of this study:

1. What interaction ratios between mothers and young children naturally occur prior to ratio-based instruction?
2. Is brief instruction effective in causing a specified change in mothers' observed interaction ratios with their child?
3. Which instruction method leads to closer approximation of 5 to 1 ratios—brief “advice giving,” or behavioral parent training regarding ratios?
4. Which variable(s) do mothers manipulate to achieve a higher ratio?

Following is a critical review of the ratio literature. The hypothesized reasons for the popularity of ratio advice will be examined first. Subsequently, empirical data linked to ratios will be presented using preliminary data from multiple settings. Finally, limits to current knowledge will be discussed as well as how the current study can inform our understanding of ratios with mothers and young children.

## REVIEW OF LITERATURE

### **Basis for Ratio Advice**

#### **Marital Research**

The ideal number of positive relative to negative interactions has been variously reported, but the highly publicized marital research of Gottman suggests that ratios that meet or exceed five positives for each negative are indicative of strong relationships (Gottman, 1994a; Gottman, 1999; Gottman & Levenson, 1992). “[The] magic ratio is 5 to 1. As long as there is 5 times as much positive feeling and interaction between husband and wife as there is negative, we found the marriage was likely to be stable” (Gottman, 1994b, p. 57).

A stated goal of Gottman’s research has been to develop a dichotomous classification system that validly predicts which couples were at risk for eventual divorce (Gottman & Levenson, 1992). Along these lines, Gottman and colleagues have sought to test the following hypothesis about marital dissolution: that the process which most significantly predicts dissolution is regulation (or the relative balance) of positive and negative interactions.

Stated simply, Gottman and colleagues have found that ratios that meet or exceed five to one are indicative of stable marriages whereas couples whose relationships are dissolving average approximately one positive for every one negative interaction (Gottman & Levenson, 1992).



Amazingly, we have found that it all comes down to a simple mathematical formula: no matter what style your marriage follows, you must have at least 5 times as many positive as negative moments together if your marriage is to be stable. (Gottman, 1994b, pp. 29)

Over a period of three decades, more than 3,000 couples have been observed in Gottman's laboratory, where their positive and negative interactions were observed and coded in detail by researchers (Gottman, 2004). Gottman's typical methodology has involved observing couples engaged in 15-minute conversations about an ongoing problem area in the marriage. Couples were also observed discussing events of the day and a pleasant topic, but the "problem area" discussions have been shown to be the best predictors of shifts in marital satisfaction over time (Gottman, 1994a; Gottman & Levenson, 1992).

Couples' interactions were coded using the Rapid Couples Interaction Scoring System (RCISS). For each turn at speech, the spouse's behavior was sorted into positive and negative RCISS speaker codes. Positive RCISS speaker codes were (a) neutral or positive problem description, (b) task-oriented relationship information, (c) assent, (d) humor-laugh, and (e) other positive. Negative RCISS speaker codes were (a) complain, (b) criticize, (c) negative relationship issue problem talk, (d) yes-but, (e) defensive, (f) put down, (g) escalate negative affect, and (h) other negative. Positive and negative codes were independent—researchers coded all that applied for each turn at speech (Gottman, 1994a).

Following coding, each spouse's number of positive codes minus negative codes was computed and graphed. The accumulated total of positive minus negative codes for each spouse was plotted across all their turns at speech. "Regulated" (stable) or

“nonregulated” (distressed) status was assigned to each couple based on the slope of their graphed data. Regulated couples had statistically significantly positive speaker slopes for both spouses. At least one spouse in nonregulated couples had a slope that was not significantly positive (Gottman, 1994a).

Four kinds of data were analyzed to assess discriminating power between regulated and nonregulated couples: (a) positive speaker codes for husband and wife, (b) negative speaker codes for husband and wife, (c) difference between positive and negative speaker codes for husband and wife, and (d) ratio of positive to negative speaker codes for husband and wife. When stepwise discriminant analyses were performed, the researchers found that all four types of data discriminated between regulated and nonregulated couples. Based on Canonical R scores for the four data types, ratio data was found to do the best job of discriminating between regulated and nonregulated couples (Gottman & Levenson, 1992). Regulated couples were consistently found to maintain a ratio of approximately 5:1 (Gottman, 1994a).

The 5:1 ratio found with RCISS codes (based on affect and verbal content) was also found using the Specific Affect Coding System (SPAFF), which only codes for affect (Gottman, 1994a). SPAFF codes examine facial expressions, tone of voice, gestures, and verbal content for indications of “sadness, fear, anger, disgust, contempt, belligerence, domination, defensiveness, stonewalling, interest, affection, humor, listener tracking, joy, surprise, and neutrality” (Gottman, 1999, p. 37; Gottman & Krokoff, 1986). SPAFF ratios were computed by dividing (humor+affection+interest+joy) by (anger+disgust/contempt+whining+sadness; Gottman, 1994a, p. 188).

Through further analysis of ratio data, Gottman divided stable (“regulated”) marriages into three distinct types: *volatile*, *validating*, and *avoidant* marriages (Gottman, 1994a). The absolute amount of positives and negatives varied across couples in the three marriage types; the *relative* amount (5:1) was constant for each. Gottman has predicted likelihood of divorce based on regulated/nonregulated status with 93% accuracy (Gottman & Levenson, 2000).

### **Theoretical Support of Ratio Concept**

Gottman’s impressive findings (Gottman, 1994a; Gottman, 1999; Gottman & Levenson, 2000) beg the question “what theoretical processes underly the relationship between high ratios and marital stability?” Gottman himself does not claim to have definitive answers about this, though he has offered some conjectures. Similar hypotheses about the possible effects of ratios on child behavior are described below. While the research questions of this thesis do not address effects of ratios on behavior, it is helpful to consider theoretical explanations for why improved behavior may be expected.

Gottman concluded that regulated couples have created an overall positive “tone” for their relationship. He hypothesized that marital relationships are dynamic interactional systems: positive interactions act as deposits to the “relationship bank,” which modifies overall relationship quality (Gottman, 1999). A healthy emotional bank account fosters what Gottman terms “positive sentiment override” when conflicts arise. Positive sentiment override provides a buffer against perceiving the partner’s negativity as a personal attack, and is useful in regulating (but not resolving) marital conflict

(Gottman, 1999, pp. 164-165). The relationship bank concept is not meant to imply that couples should keep close tabs on all “deposits” and “withdrawals”; in fact, “unhappy couples are the ones who keep tabs on positives given and received, whereas happy couples are positive unconditionally” (Gottman, 1999, p. 12). Couples with lower ratios may be subject to *negative* sentiment override: If a couple is distressed, negativity from one spouse is more likely to be met with negativity by the other spouse (Notarius, Benson, Sloane, Vanzetti, & Hornyak, 1989); and negative events more often result in a decline in overall marital satisfaction (Jacobson, Follete, & McDonald, 1982). Not surprisingly, nonregulated couples were found to exhibit more negative behaviors such as defensiveness, stubbornness, anger, whining, and withdrawal (Gottman & Levenson, 1992).

Gottman has indicated that it is not possible (or even desirable) to have *only* positive interactions in a marriage. “Stability in marriage is likely based in the ability to produce a fairly high balance of positive to negative behaviors and not in the exclusion of all negative behaviors” (Gottman & Levenson, 1992). His message has been “accentuate the positive, don’t eliminate the negative” (Gottman, 1994b, p. 56).

Gottman’s research (Gottman, 1994a; Gottman, 1999; Gottman & Levenson, 2000) is likely not the only variable that has contributed to the proliferation of ratio advice for parents. Several researchers have forwarded the concept of reciprocity or parental responsiveness in connection with parent-child relations and effecting behavior change in children. While not as well known, the implications of such research on

parental advice are more direct, and are linked to well-established theories accounting for child behavior.

One way to think about ratios in parent-child contexts is that the parent behaviors included on the positive side of the ratio reflect parental responsiveness. Responsiveness is defined as “appropriate, contingent maternal responses of neutral, positive, and sometimes negative content” (Wahler & Meginnis, 1997, p. 433). Increased compliance based on parental responsiveness has been forwarded as an aspect of social attachment theory: The attachment concept of “reciprocity” holds that if maternal responses to child behavior are appropriate and consistent, the child is likely to behave in ways to sustain the interaction (Parpal & Maccoby, 1985; Wahler, Herring, & Edwards, 2001).

Reciprocity theory is similar to the behavioral principle known as the matching law (Herrnstein, 1961), which asserts that the “rates of different responses tend to equal the relative reinforcement rates they produce” (Catania, 1992, p. 382). However, the matching law is derived from basic laboratory science, and may be of limited generalizability (Catania, 1992). Furthermore, behavioral theories account for the impact of reinforcement and punishment upon behavior, but not upon *relationships*.

Wahler and Meginnis (1997) found maternal responsiveness to increase child compliance *and* improve parent-child relationships. Their study compared the merits of two components of responsiveness, praise, and mirroring, in the interactions of mother-child dyads (average child age was 7.5 years). Praise and mirroring were defined in the study to be mutually exclusive. Verbal mirroring was a description of the child’s behavior or paraphrasing of child verbalizations, delivered with neutral affect.

Conversely, praise was positive affect (in tone and content) without any information about the child's behavior. (Other researchers have included neutral descriptions of child behavior as positives in the computation of ratios (Hart & Risley, 1995; Powers & Roberts, 1995)). Children in the mirroring group displayed nearly identical percentages of compliance as the children in the praise group; both were more compliant than children in the control group. The authors concluded that maternal responsiveness, and not mirroring or praise per se, accounted for the effects on compliance (Wahler & Meginnis, 1997). "Presumably, maternal congruence creates a harmony or synchrony that fosters child reciprocity, in general, as well as specifically fostering compliance" (Wahler & Meginnis, 1997, p. 433).

According to attachment theory, displays of parental responsivity and support to young children increase the likelihood of secure attachment and behavioral regulation. Such parental behaviors are indicative of an authoritative parenting style, which style is associated with adaptive child behavior (Baumrind, 1967, 1971). Therefore, if higher ratios do improve child behavior, it may be as a byproduct of associated relationship improvement.

Wahler has suggested that parents can "orchestrate interactional synchrony" by the minimal use of instructions and by giving social attention to children's prosocial approaches. He explained that, "children's reciprocity is most likely to occur when the mother-child social exchanges are largely made up of prosocial child-initiated activities and minimally made up of instruction-compliance exchanges" (Wahler et al., 2001, p. 477). Though not explained in ratio terms, the concept of reciprocity underscores the

need for parents to arrange the frequency and types of interactions to maximize child outcomes.

This is not to say that young children are keeping mental lists of “‘good’ and ‘bad’ interactions with mom.” Although implied by the term, “reciprocity” does not necessarily operate on a quid pro quo basis. Quid pro quo, negotiation-based, reciprocity may not apply to relationships between parents and young children. Berndt (1979) reported that children under age six do not judge others’ actions according to norms of reciprocity and fairness. Preschool children are not “keeping track.” If reciprocity applies in relationships with young children, it is in the “synchrony” sense: that the child behaves in ways so as to sustain interactions with the parent.

Prevailing theories including those discussed above, along with Gottman’s research, are potential factors influencing the popularity of ratio advice. As mentioned previously, despite its popularity, a careful review of pertinent empirical work is needed to establish the limits of empirical support for ratio advice.

### **Implications of Marital Research on Mother-Child Relationships**

Even though John Gottman himself dubbed 5:1 the “magic ratio,” he has claimed only that a 5:1 ratio is indicative of marital stability for couples engaged in conflict resolution (Gottman, 1999). Gottman’s research was conducted in laboratory settings and is entirely correlational, thus the findings may be of limited generalizability, even for married couples (Kim, Capaldi, & Crosby, 2007; Stanley, Bradbury, & Markman, 2000). Nonetheless, what Gottman defined narrowly has been applied broadly.

Actual implications for advising parents based on Gottman's research have been few. Gottman's research has employed ratios as dependent, not independent, variables. Gottman's claim that specific interaction ratios describe certain kinds of relationships stops short of saying "employing these ratios will *create* certain kinds of relationships or bring about certain behavioral outcomes." For example, though positive sentiment override is important, using the concept as a *suggestion* for troubled marriages alone does not help regulate conflict—telling couples "just be more positive" is not effective. (Gottman, 1994b). For married couples, it appears that the active ingredients of ratios can be primarily found in *affective content*, because coding affect alone and coding affect and verbal content together yielded the same ratios (Gottman, 1994a).

While it may be the case that Gottman's actual findings (Gottman, 1994a; Gottman, 1999; Gottman & Levenson, 2000) possess seemingly few implications for parent-child relations, it is very possible that Gottman's work has been overgeneralized and is, in part, the guiding influence by which ratio advice is given to parents. It is likely not mere coincidence that most ratio advice given to parents falls in the range of 4-6:1 (positives:negatives), which is very consistent with Gottman's ratio of 5:1.

### **Ratio Manipulations as Interventions**

#### **Parental Ability to Achieve Prescribed Ratios**

Were ratio advice found to be valid for parents, it would likely be delivered to parents in the context of relatively brief therapy interactions. Not surprisingly, interventions that are quick to explain and easily understood by parents are the most



likely to be implemented. Many behavioral parent-training modules (Hembree-Kigin & McNeil, 1995; McMahon & Forehand, 2003; Sanders, Lynch, & Markie-Dadds, 1994; Webster-Stratton & Hancock, 1998) advise the strategic use of differential attention (i.e., positive attention and selective ignoring). However, these modules do not explain such strategies in terms of positive/negative *ratios*, nor do they encourage parents to use them at specific target levels. Suggesting interaction ratios as a method for managing differential attention strategies may simplify the process and maximize its effects.

No empirical studies were identified that have measured parents' ability to achieve prescribed interaction ratios. However, parents' implementation of other kinds of positive parenting advice with a high degree of treatment fidelity (defined as parental adherence to treatment protocols) suggests that parents possess the ability to make similar changes as those required by ratio advice. Unfortunately, treatment fidelity data are not frequently reported in parent-training outcome studies. A 1992 review of behavioral parent-training outcome studies conducted between 1975 and 1990 showed that only 6% of 88 group studies and 12% of 60 case studies reported any treatment fidelity data (Rogers-Weise, 1992). Maughan, Christiansen, Jenson, Olympia, and Clark, in a 2005 meta-analysis, found treatment fidelity data in only 16 of 79 behavioral parent-training outcome studies conducted between 1966 and 2001. Neither review clarified whether available fidelity data examined fidelity on the part of clinicians, parents, or both. When fidelity data are reported, lower treatment fidelity is associated with diminished clinical outcomes (Dane & Schneider, 1998; Rogers-Weise, 1992).

Research was found showing that parents have been able to implement positive components of behavioral training (e.g., contingent delivery of attention, child-directed interaction, and selected ignoring) as taught (Mandal, Olmi, Edwards, Tingstrom, & Benoit, 2000; Schuhmann, Foote, Eyberg, Boggs, & Algina, 1998). Mandal et al. (2000) measured parents' adherence to "time in" strategies with preschool children (age range: 2.5 to 4.0 years). "Time in" was defined as contingent verbal praise and/or physical touch—parents were to demonstrate these behaviors at least 10 times per observation session (sessions were of various lengths because they continued until the child's behavior was stable). The range of treatment fidelity for the four parents in the study was 80-100%. Parents maintained this level of treatment fidelity when asked to combine time in strategies with another positive parenting strategy (i.e., effective instruction delivery; Mandal et al., 2000).

Parents have also demonstrated a high degree of fidelity to components of Eyberg's Parent-Child Interaction Therapy (PCIT; Schuhmann et al., 1998). Parents were trained to use strategic positive attention in the contexts of child-directed interactions (CDI) and parent-directed interactions (PDI). CDI and PDI training was conducted in three sessions and consisted of extensive coaching from a clinician via didactic instruction, modeling, role playing, and a bug-in-the-ear system. CDI and PDI training lasted three weeks each—additional training did not occur until parents met criteria for mastery in these domains. During 5 minutes of CDI parents were to use five behavioral descriptions, five reflections, 15 praises (8 of which were to be labeled), and fewer than three commands, questions, and criticisms. To demonstrate mastery of PDI

skills, 75% of parents' commands were to be direct, and child compliance to commands was 100% (Schuhmann et al., 1998). After mastery had been achieved, researchers observed parents engaging in CDI and PDI, and discovered that parents implemented treatment protocols with 97% fidelity (Schuhmann et al., 1998). Five-minute "fidelity checks" of CDI and PDI at the beginning of sessions are standard PCIT practice (Eyberg & McDiarmid, 2005). This level of mastery suggests that, with training, parents can increase positives and decrease negatives in a manner suggested by researchers.

Kotler and McMahon (2004) trained parents in the use of "child's game" interactions and measured the effects of child's game on rates of compliance of preschool children (mean age: 4.29 years). The study examined three groups of 20 mother-child dyads, grouped according to child characteristics: anxious, aggressive, and socially competent. Similar to the PCIT model, child's game consisted of increasing "desirable" behaviors (i.e., attending comments, specific praise, and nonspecific praise), while avoiding "undesirable" behaviors (i.e., criticisms, commands, and questions). Kotler and McMahon utilized role playing and one-way communication techniques during single 30-minute training sessions. Immediately following training, the mother was observed using child's game for 5 minutes, in which she was to use at least four attending or praise statements per minute and no more than 0.4 criticisms, commands, or questions per minute. These target levels of maternal positives and negatives were used only to assess mastery of training; mothers were not told to target specific levels at home. After practicing child's game every day for a week, mothers were observed again to evaluate the child's behavior and the mother's adherence to child's game procedures. The

researchers found that mothers of each group of children were able to increase their use of the “desirable” and decrease use of the “undesirable” behaviors during child’s game, which changes were associated with significantly improved child behavior. Mothers of aggressive children showed the most improvement, suggesting “that mothers who may initially have lower levels of “desirable” and higher levels of “undesirable” parenting behaviors can “catch up” with training and practice” (Kotler & McMahon, 2004, p. 510). Again, parents were shown to apply treatment demands with a high degree of fidelity.

A study by Field et al. (2004) found that *surrogate* parents in an adolescent residential treatment setting were able to alter their interaction ratios with youth in a way specified by researchers. Surrogate parents were able to reach shifting ratio goals as required by different phases of the study (ratio goals alternated from 6:1 to 12:1). A method for tracking positive and negative interactions was an existing feature of standardized programming that facilitated the achievement of target ratios (the method will be described in detail hereafter). Although initial fidelity to the treatment plan was demonstrated, continued fidelity was not. Positive/negative ratios had dropped from the specified target of 12:1 to 8:1 at the time of a 1-week follow-up observation (Field et al., 2004). Because of initial adherence, the lack of treatment fidelity over time did not appear to reflect an *inability* of the surrogate parents to attain ratios, but indicated difficulty in maintaining the exceptionally high (12:1) *level* of ratio they had been asked to maintain.

The degree to which adults have adhered to prescribed levels of positives and negatives in educational settings has also varied (van der Mars, 1987; Van Houten &

Sullivan, 1975). Teachers' adherence to requested changes in levels and/or types of feedback is more likely when they are cued to do so in the classroom. Several studies have found support for specific cueing methods, including teacher self-scoring (Gunter & Reed, 1996), and training students to recruit positive attention (Stokes, Fowler, & Baer, 1978; Wallace, Cox, & Skinner, 2003).

The demonstrated ability of parents and teachers to implement positive techniques (as found in parenting or classroom management advice) according to protocol suggests that parents may be able to meet the requirements of ratio training as intended by those prescribing specific ratios.

### **Baseline Ratio Behavior of Parents**

To discover if parents stand to improve their ratios in the first place, and to begin understanding how best to help them do so, it is important to have accurate understanding of baseline ratio behavior of different types of families in different settings.

Pioneering studies suggesting the importance of interaction ratios were published by R. B. Stuart in 1971. Stuart compared interaction patterns in families with adolescent delinquents with families with nondelinquent adolescents, and reported positive/negative ratios for each family type. Across studies "delinquents" were youth who "had been arrested three or more times and who had been convicted of a punishable (nontraffic) offense at least one time" (Stuart, 1971, p. 185). "Nondelinquents" had never been arrested or convicted of any offense. Stuart sought to demonstrate that "delinquent families differ significantly from nondelinquent families in the rate of positive and

aversive stimulation, and that these aversive patterns can be systematically modified” (Stuart, 1971, p. 184).

In Stuart’s first study, 18 families with an adolescent delinquent were matched with 18 families with a nondelinquent adolescent (average age was 15.8 years). Each family was recorded in their homes engaging in problem-solving conversations: they were given an inventory of topics and asked to discuss five. Topics included “who the teen dates,” “how the teen wears his/her hair,” and “what the teen studies in school” (Stuart, 1971, p. 185). Positive and negative statements were coded from tape recordings. Unfortunately, operational definitions of positives and negatives were not provided in the article. The researchers did not specify guidelines for interactions, nor was the length of the sessions standardized across families. According to Stuart, comparing individual cases was unwieldy because of large differences in length of exchanges and number of “conversational units.” Instead of reporting individual families’ ratios as averages, it was decided “that the raw number of positives was probably less important than the relative number as expressed in percentage” (p. 186). Stuart opted to report cumulative totals of positive and negative statements, added across families. Stuart reported a .86:1 ratio (533 positives, 620 negatives) for “delinquent families.” A ratio of 3.6:1 (1,079 positives, 303 negatives) was reported for “nondelinquent families” (Stuart, 1971). These initial results suggested that relative levels of positive and negative interactions varied based on the study’s “delinquent” and “nondelinquent” variables.

Stuart’s second study (1971) examined mother-adolescent interaction data as reported by the participants themselves. Participants were 14 delinquents and 14

nondelinquents (average age = 15.2) and their mothers, who had not participated in the first study. Dyads were recorded in their homes for five 45-minute sessions. During each session they were to discuss four items from the same inventory used in the first study. Unique to this study was that mother and adolescent both pressed buttons for each perceived positive and negative evaluation when they were received from the other person. Again, cumulative totals were reported. A 1.1:1 ratio (4,281 positives, 4,024 negatives) was reported for delinquent pairs. Nondelinquent dyads had a ratio of 3.8:1 (15,276 positives, 4,021 negatives). As in Stuart's first study (1971), significant differences between the two family "types" were discovered, but information about individual dyads cannot be drawn from the aggregated data.

Significantly, the differences in delinquent and nondelinquent families' ratios were approximately the same across both studies, using different samples and different methods. Further, in each study, a high positive ratio was reported in nondelinquent families, and a low positive ratio was found in delinquent families. These figures (approximately 4:1 and 1:1 in both studies) are very close to those Gottman found for "regulated" and "nonregulated couples" (Gottman & Levenson, 2000).

The first research that considered ratios in the context of parents' interactions with young children was published in 1995 by Hart and Risley. In their book, *Meaningful Differences in the Everyday Experience of Young American Children*, Hart and Risley discussed the different verbal patterns of 42 families of various backgrounds. The research reported in the book was not a controlled experimental study, but a descriptive study that involved monthly hour-long observations of each family, across 2.5 years. The

age of the children at the time of first observation ranged from 7 to 12 months and averaged 9 months. Researchers focused exclusively on *verbal* interactions, classifying various types of verbalizations as either positive or negative.

Positive verbalizations were praise, parent imitations, “I love you,” and parent repetitions that were used to confirm, model, and prompt language. Repetitions were of two types: (a) parent *expansions*, or gentle corrections of incorrect/incomplete speech, and (b) parent *extensions*, or repetitions that add more detail to what the child said (Hart & Risley, 1995, p. 110). Negative verbalizations were (a) negative evaluations (e.g., “You’re being bad, wrong, stupid, etc.”), and (b) prohibitions (e.g., “Stop being so mean,” “Don’t \_\_\_\_\_,” “Shut up,” “Quit,” etc.; Hart & Risley, 1995, p. 111). Hart and Risley created an interaction variable called “feedback tone,” similar to positive/negative ratios. Feedback tone was computed by dividing the number of positive verbalizations by the number of positive plus negative verbalizations (Hart & Risley, 1995).

They found significant differences in feedback tone between the socioeconomic groups they examined. Parents in professional families gave positive verbal attention to their children about every other minute, and demonstrated a ratio of six to one. In contrast, working-class parents’ ratio was two to one, while welfare parents averaged two *negatives* for each positive (Hart & Risley, 1995, p. 199).

The researchers also found that professional parents spoke almost 300 words per hour more than welfare parents. They further explained that, “[w]elfare parents initiated interaction no less often than professional parents and used imperatives no less often. The lesser amount of talk led to interactions richer in imperatives and made...negative



imperatives a much more prominent part of the children's experience" (Hart & Risley, 1995, p. 126). Though not technically a positive/negative interaction ratio, feedback tone illustrates an important ratio principle: Higher overall levels of interaction are needed to keep necessary negatives from "spoiling the ratio."

### **Observed Impact of Ratio Training**

For ratios to be considered valid parenting advice, positive effects on child behavior will need to be demonstrated empirically. There are virtually no experimental studies measuring the direct effects of ratio manipulation on child behavior; however, a preliminary basis for expecting such effects may be found in research literature showing significant effects by using similar positive interventions.

As mentioned previously, a large and robust literature has demonstrated clear experimental control of positive elements of behavioral parent-training practices on specific behaviors of children from a wide spectrum of ages and backgrounds (Hembree-Kigin & McNeil, 1995; Kotler & McMahon, 2004; Mandal et al., 2000; McMahon & Forehand, 2003; Sanders et al., 1994; Schuhmann et al., 1998; Webster-Stratton & Hancock, 1998).

A large body of classroom management literature supports boosting the number of positive teacher interactions as a way to improve educational outcomes (Ferguson & Houghton, 1992; Jenson, Olympia, & Farley, 2004; Swinson & Harrop, 2001). The classroom management literature which supports boosting positivity focuses on recommendations in terms of *praise rates*, not *ratios*. High rates of teacher praise have been linked to greater student attentiveness and academic achievement (Dunlap et al.,

1993; Kuhn, 1975), and fewer office discipline referrals (Garcia, Burke, Powell, Oats, & Bolton, 2005). Recommendations for effective teaching have been summarized thus: “almost never use criticism, have and communicate high expectation, present task-oriented instruction, reinforce on-task behavior, and use high rates of the contingent praise” (Voelker Morsink, Chase Thomas, & Smith-Davis, 1987, p. 291). Studies that promote boosting praise rates are not considered part of the ratio literature, per se, because they do not take negative interactions into account. However, because boosting positives most likely boosts ratios, praise rate literature is important in terms of the ways adults are trained to use positives and the effects that ensue.

Though less common than discussions of praise rates, some explicit recommendations for increasing ratios have appeared in the education literature, though these suggestions were not linked to empirical data. Advocates of School-wide Positive Behavior Support have taught that 5:1 ratios are a key element of their programs: “Every faculty and staff member acknowledges appropriate behavior: 5 to 1 ratio of positive to negative contacts” (Sugai, Horner, Todd, & Lewis-Palmer, 2004).

Madsen (1969) advocated that teachers apply a 4:1 ratio in the classroom. He taught teachers that 80% of their interactions with students should be “approvals” as opposed to “disapprovals” (Madsen, 1969; see also Loney, Weissenburger, Woolson, & Lichty, 1979). This is apparently no easy task as the average teacher has been found to be disapproving 80% of the time (Latham, 2001; Weissenburger & Loney, 1977).

To improve classroom behavior, praise must function as a reinforcer (Brophy, 1981). Praise is not always reinforcing, although there are techniques to increase the

likelihood that praise serves as such. To serve as reinforcement, praise must be (a) contingent, (b) specific, and (c) sincere, varied, and credible (Brophy, 1981; O’Leary & O’Leary, 1977). Madsen, Becker, and Thomas (1968) proposed that effective praise is free of sarcasm. To be advisable, praise rate training should include instruction about how to help make praise reinforcing.

Just as Gottman has emphasized “necessary negatives” (Gottman, 1994b), education researchers have warned against eliminating negative interactions altogether (Acker & O’Leary, 1987; Jenson et al., 2004; Pffner, Rosen, & O’Leary, 1985; Rosen, O’Leary, Joyce, Conway, & Pffner, 1984; Stage & Quiroz, 1997). Rosen et al. (1984) found that academic and social functioning significantly diminished when teachers withdrew all negative feedback from externalizing students. Acker and O’Leary (1987) found that praise alone did not affect on-task behavior and academic achievement, but student performance was increased when praise and reprimands were used together.

Increasing positive/negative interaction ratios has been shown to be modestly effective in decreasing disruptive behavior with some adolescents in residential care, especially when linked to functional assessment data. These studies (Field et al., 2004; Friman et al., 1997) were conducted at Father Flanagan's Boys’ Home (Boys Town) with youth and their surrogate parents.

Youth at Boys Town reside in homes of eight adolescents, a married couple (“family teachers”), and one assistant family teacher. Family teachers and researchers in both Boys Town studies benefitted from a systematic method already in place with which to track and adjust ratios and to gather ratio data for research purposes. Within this

system, when family teachers were asked to manipulate ratios they already had a convenient monitoring system and a clear idea of which interactions belonged on the positive and negative lists (Field et al., 2004; Friman et al., 1997). Youth in the program are required to carry a “point card,” a daily record of positive and negative interactions with adults. Positive interactions, referred to as “effective praise,” consisted of five components: (a) praise, (b) description of behavior being praised, (c) rationale, (d) request for acknowledgment, and (e) a point award. Negative “teaching interactions” consisted of (a) initial praise, empathy, or affection; (b) description of the targeted behavior; (c) request for acknowledgment; and (d) a point fine (Friman et al., 1997). Points were part of a token-economy system in which accrued points could be exchanged for reinforcers. In both studies, positive/negative ratios were computed daily, based on number of effective praise interactions divided by teaching interactions. This ratio can also be called “awards per fine.”

Friman et al. (1997) sought to decrease the substantial behavior problems of six “highly disruptive” adolescent males ages 11 to 15. Youth were chosen for the study based on having positive/negative point card ratios below 5 to 1. Also, each youth was on probation, in jeopardy of being assigned a more restrictive placement.

Each day during baseline, point cards were audited and family teachers completed the Parent Daily Report (PDR), a checklist of problem behaviors. At the conclusion of the baseline phase, the adolescent’s baseline ratios were shown to the family teachers. During intervention, family teachers were to at least double the adolescent’s positive/negative ratio. This could be done by (a) recognizing more opportunities to

reward appropriate behaviors with effective praise, and/or (b) minimizing the number of teaching interactions for minor infractions (without ignoring major misbehavior).

Changes in individual ratios from baseline to intervention ranged from 76% to 195% improvement (Friman et al., 1997). The intervention ratio was at least double the baseline ratio in two of the six cases. Analysis of baseline and intervention PDR scores revealed substantial improvement in three of the cases, and little or no improvement in the other three. Because clear experimental control was achieved in only half the cases, the authors were hesitant to assert that boosting positive/negative ratios significantly reduced behavior problems.

Field et al. (2004) designed a ratio intervention for a single 12-year old male, John, who was selected because of serious problem behaviors including noncompliance, impulsivity, verbal and physical aggression toward peers, depressed affect, and self-injurious behavior. Based on functional assessment data, an experimental treatment was designed that alternated between 6:1 and 12:1 ratios. Positive and negative interactions were defined as in the previous study (Friman et al., 1997). The dependent variables in this case were (a) frequency of noncompliance, and (b) incidents of crisis teaching. Clear differences were observed for both outcome variables across experimental conditions. Both noncompliance and crisis teaching decreased significantly during modified treatment, and returned to previous levels upon reversal to standard treatment. At 1-week follow-up, when ratios had dipped to 8:1, noncompliance and crisis teaching had returned to original levels (Field et al., 2004). This study is significant for its emphasis on linking

ratio intervention to functional assessment data, and for the degree to which very difficult adolescent behaviors were improved based on changes in ratios.

To summarize, empirical data exist that demonstrate the effectiveness of increasing numbers of positive interactions with children and youth. Minimizing (but not eliminating) negative interactions has also changed child behavior in a positive direction. However, virtually absent from the empirical literature are investigations that frame changes in interaction patterns as alterations of *ratios*, especially in the context of parents' relationships with their young children.

### **Social Validity**

Interventions possess social validity if the techniques and outcomes are acceptable and relevant for the intervention's recipients (see Wolf, 1978). The question of whether ratio interventions are acceptable for parents is closely tied to the unanswered research questions of this proposed study (i.e., whether parents *can* achieve certain ratios and how they change their behavior to achieve them).

While we do not yet have definitive answers to these questions, the popularity of ratio advice likely indicates a high degree of social validity. The approach may appeal to parents and educators because it possesses both humanistic and realistic qualities in that it emphasizes positives but allows (and even requires) *some* negatives.

As mentioned above, the elimination of all negative interactions is not recommended for parents or teachers. Research by Madsen and colleagues (1968) further indicated that such advice would not be *acceptable* to educators. In one phase of their classroom study (Madsen et al., 1968), two teachers were instructed to ignore all

inappropriate behaviors. The teachers not only found the ignoring phase “very unpleasant,” but were unwilling to eliminate negative feedback completely. One teacher cut negative feedback from one comment per minute to three comments in four minutes. The other teacher cut her critical comments in half, from one per minute to one in two minutes (Madsen et al., 1968). This suggests that, not only is it ineffective, but, eliminating all negative interactions may be undesirable and difficult.

Wahler and Meginnis (1997) found that maternal praise and maternal mirroring had the same effects on child behavior. However, mothers’ subjective ratings of the two approaches indicated they were significantly more satisfied with praise over neutral mirroring (Wahler & Meginnis, 1997).

Social validity is also revealed in part by the extent to which interventions are implemented with fidelity and maintained over time. Recent scholarship has pointed to a link between behavioral parent training and mindfulness (Dumas, 2005; Eyberg & Graham-Pole, 2005). Mothers and children practice repeated patterns of behavior to the point that the behaviors become *automatized transactional procedures* (Dumas, 2005). If new parent behaviors (e.g., boosted ratios) are to generalize and maintain over time, they must be overlearned to the point that they are “mindless” (Dumas, 2005; Eyberg & Graham-Pole, 2005). The greater the automaticity of ratio behavior, the more parents may be able to expect improved child behavior and better relationship quality. Were these results achieved, the fact that positive effects were maintained over time would contribute to the social validity of ratio interventions.

### **Summary of Research Findings**

Given that positive/negative interaction ratios of at least 5:1 are indicative of high relationship quality in some contexts, boosting parent-child positive/negative ratios to 5:1 or greater could be sound parenting advice and is an empirical question deserving investigation. Advice to parents about ratios was found in lay literature, but has not been included in clinical child psychology literature or parent-training protocols.

Some theoretical basis exists for predicting that improved maternal ratios would have a positive impact on child behavior. Improved child behavior may be at least partly rooted in healthy parent-child relationships, which may be strengthened by greater degrees of parental responsiveness. Boosting ratios through increased use of positive feedback and contingent neutral attention increases the level of parental responsiveness, which increases the likelihood that children will continue to behave in such a way as to sustain the interaction.

A large body of research has demonstrated the efficacy of interventions that are based upon increasing the quality and quantity of positive interactions in the contexts of parent-child and teacher-student relationships. Higher numbers of positive interactions almost guarantees higher ratios, though caregivers are not specifically instructed to manipulate ratios in these interventions. Increased positive interactions have been associated with improvements in compliance and prosocial approaches. High praise rates can improve educational outcomes and behavior (e.g., attentiveness, and academic performance; Jenson et al., 2004; Latham, 1997; Swinson & Harrop, 2001). Further, preliminary evidence indicated that elevated ratios can improve adolescent behavior in



residential treatment settings (Field et al., 2004; Friman et al., 1997). Parents have been able to implement positive components of other intervention protocols with a high degree of treatment fidelity, suggesting that they may have the same ability regarding ratios.

Descriptive research (Hart & Risley, 1995; Stuart, 1971) has found that certain parent-child interaction ratios are indicative of certain types of families. These reported ratios are very similar to the ratios Gottman described as being indicative of “regulated” and “nonregulated” marital relationships (Gottman & Levenson, 2000). The research highlighted in this review indicated that providing ratio advice to parents of young children has a logical basis, but is not directly supported by empirical data.

### **Limits of Knowledge**

The current state of the ratio literature suggests many possible directions for further research. Because mother-child dynamics are not entirely comparable with marital relationships, we do not yet know if ratios exist that reliably describe different types of mother-child dyads, though some preliminary data suggests this (Hart & Risley, 1995).

The differential impact of ratios on children of various developmental levels has not yet been explored. Although researchers and lay authors have speculated regarding the effects of maternal ratios on child behavior and on mother-child relationships, empirical studies in this area have yet to be performed.

Ratios have been defined differently across studies. When computing ratios, researchers have placed different emphasis on verbal interaction, affective content,

praise, and mirroring. If ratios are found to be applicable to young children, establishing which verbalizations and behaviors belong on the positive and negative lists would be valuable.

Because most empirical ratio studies have not included preference assessments or functional analyses, the question of which aspect(s) of ratio account for greatest effect(s) has yet to be addressed. No data were reported in any of the experimental studies regarding the *manner* in which adults adjusted their interaction ratios (i.e., by increasing positives, decreasing negatives, or a combination of both). Were this information available, professionals would have a basis for developing best practices for ratio training. Topics to be addressed in training would certainly include guidance on how to avoid boosting positives inappropriately, and how to avoid ignoring necessary negatives. Because of the paucity of empirical research such questions do not yet have answers.

Ratio advice is not warranted if parents cannot accomplish prescribed ratios. Some would argue that, because the advice is intuitive, it “couldn’t hurt.” This may be true for many families, but there is some risk that families will try and fail to employ a ratio strategy when a more efficient or empirically sound treatment could be utilized. Therefore, by testing ratios’ attainability, insights into the appropriateness of ratio advice can be gained.

Given that ratio-based parenting recommendations are commonplace and that we know little about ratios, especially in the context of parent-child interactions, research is needed that will answer vital questions and inform clinical practice. The purpose of the

current research was to begin to explore increasing positive/negative ratios as meaningful advice within the relationships of parents and young children.

## METHOD

### **Population and Sample**

Four mother-child dyads were sought as participants for each of two groups (Group A and Group B, described below). A typically developing sample of children ages 3.0 to 5.0 years was sought. Participants were recruited via the posting of fliers in community grocery stores and libraries (see Appendix H).

Five exclusion criteria were used to determine the eligibility of participants. Mother-child dyads were not eligible if (a) the child had ever been the recipient of psychological services, (b) the child had been diagnosed with a developmental delay, (c) the family had received family therapy related to parent-child interactions, (d) the child scored in the clinical range on the Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999), and/or (e) if the mother's ratio met or exceeded 5:1 during a screening evaluation. The first three criteria were assessed over the phone at the time potential participants contacted the researchers. Mothers were asked whether their child had received services and whether the child reached major developmental milestones on time.

Observational screening was based on live coding of the baseline observation phase: if the mother's observed ratio met or exceeded 5:1, the observation was to be discontinued. Based on live coding of the first observation session, no participants met or exceeded 5:1, and all continued through the end of the second observation.

Eleven mother-child dyads participated in the data collection procedures described above. Of these, data from eight dyads were included in the study; data from

three of the 11 dyads were later determined to be unsuitable for inclusion. One dyad could not be included because their ECBI scores exceeded clinical cutoffs on both the intensity scale and the problem scale. For two of the dyads, English was not the language spoken in the home. Both mothers made efforts to speak English during the observations and to translate any non-English verbalizations; however, it was determined that this process represented too large a departure from that used by the other families.

The eight eligible dyads were randomly assigned to either Group A or Group B, and complete observations were conducted. Every participant read and signed the consent form approved by USU's Institutional Review Board. Of the eight dyads included in the study, there were four male and four female children whose ages ranged from 3 years 1 month to 4 years 11 months. Age, sex, and ECBI scores are provided in Table 1 below.

Table 1

*Demographic Data*

Participant	Age of child	Sex of child	ECBI intensity scale (clinical cutoff = 132)	ECBI problem scale (clinical cutoff = 15)
A1	3 years 2 months	Male	110	1
A2	3 years 1 month	Female	120	0
A3	3 years 6 months	Male	118	2
A4	4 years 1 month	Male	127	9
B1	3 years 8 months	Male	123	13
B2	4 years 11 months	Female	129	5
B3	3 years 5 months	Female	106	13
B4	3 years 10 months	Female	118	6

### **Setting**

The study was conducted in a single room in a research lab in the USU Psychology Department. The room contained an adult-sized table with four chairs, one child-sized table, two small chairs, and shelving for toys (within the child's reach). The shelves contained blocks, a rotating fishing game, and a small candy dish. The small table contained a set of Play-doh toys. A colorful kite hung from the ceiling in the corner, within reach of children on the floor. In the center of the floor was an assortment of farm animal toys, a few books, several checkers/parts from various games, and some play people.

### **Design**

The study compared two ratio training methods, and employed a pre-post design. Each mother-child dyad that passed the screening was assigned randomly to Group A (brief ratio training) or Group B (brief ratio training plus modeling, role play, and feedback). Assignment into groups was determined by the order in which the dyads participated (i.e., the first dyad was assigned to Group A, the second dyad was assigned to Group B, etc.).

For both groups two observation phases were separated by a brief training period. The preinstruction phase was a baseline observation; in the postinstruction phase, mothers were asked to increase their interaction ratios to the desired 5:1 level.

## **Procedure**

Data from each mother-child dyad were gathered in a single 1-hour visit. The author met briefly with the participants to provide instructions and obtain consent (see Appendix G). The dyads were then observed from a nearby room for 16 minutes.

Prior to entering the room, mothers were instructed to work at the table while the child played on the floor. Mothers were told to address rule violations as they would at home. The guidelines were read to mothers from a script (see Appendix C: Instructions to Mothers Prior to Entering Observation Room). Mothers were asked to read scripted instructions to their child upon entering the room (see Appendix D: Instructions to Children upon Entering Observation Room).

Following the first 16-minute observation session, the mother and child were brought to an adjoining room where one of two brief training protocols was presented to the mother. The researchers talked with the mother for 10 minutes while the child played with blocks. Group A received instruction from a scripted protocol consisting of (a) a definition of interaction ratios, (b) a rationale for using ratios, (c) brief examples of parental behaviors considered “positive” and “negative,” and (d) a request for the mother to achieve a 5:1 ratio during the second observation period (see Appendix A: Brief Ratio Instruction Script). The instruction given to Group B consisted of the same components as the Group A script, with the addition of a brief demonstration, role play, and feedback (see Appendix B: Brief Ratio Instruction Plus Modeling, Role Play, and Feedback). The instruction phase for both groups lasted 10 minutes. Because Group A did not receive as

much instruction as Group B, the instruction phase for Group 1 began with 5 minutes of “small talk.”

Following training, each mother-child dyad participated in a second 16-minute observation in which mothers were asked to follow the same guidelines as in the first phase. After the second phase, a researcher debriefed participants and answered any study-related questions (see Appendix E: Debriefing Script).

### **Measures**

Direct behavioral observation was used to collect data relevant to the research questions. Data were obtained using a coding system created by the researcher (see Appendix F: Coding Parent Behaviors). Because the research questions concern the behavior of mothers toward their children, child behaviors and verbalizations were not coded. Specific measurements derived from the observational data included mothers’ ratios during the baseline and postinstruction phases, the direction and magnitude of changes in mothers’ behaviors, and data regarding which specific behaviors were manipulated to achieve target ratios.

Live coding during the baseline phase was used for screening purposes only. Meticulous coding of both phases was performed at a later time using DVD recordings of each session, including 37% of observations double-code for interobserver reliability. Mothers’ behaviors and verbalizations were coded using an event recording procedure. Coding sheets were organized in 10-second intervals, to promote reliability and accuracy. Positive codes were praise, physical affection, laughter, allowing requests, imitations,



descriptions, positive gestures, positive reference, and positive other. Negative codes were yelling, reprimands, threats, time out, denying requests, criticism, negative physical contact, negative gestures, negative laughter, negative other, and rule reminder (see Appendix F: Coding Parent Behaviors for a detailed description of each code).

As mentioned above, the ECBI (Eyberg & Pincus, 1999) was used as a screening instrument and exclusion criterion. Numerous studies have demonstrated the reliability and validity of the ECBI's Problem and Intensity Scales (Benzies, Harrison, & Magill-Evans, 1998; Bor & Sanders, 2004; Eyberg, Boggs, & Rodriguez, 1992; Funderburk, Eyberg, Rich, & Behar, 2003; Webster-Stratton, 1988). The ECBI helped ensure the child's behaviors were at an age-typical level. The ECBI's intensity scale provides indicators of severity of a child's problem behaviors; the problem scale of the ECBI indicates to what extent the problem behaviors are a concern for the parent. Standard ECBI cutoff scores are 132 for the intensity scale and 15 for the problem scale.

### **Interobserver Reliability**

Interobserver reliability was evaluated through the use of agreement ratios and inspection of approximately 37% of all observational data. The researcher trained a fellow doctoral student in the coding system by explaining the operational definitions in detail and conducting two practice sessions, in which they watched video footage together.

Many of the behaviors coded occurred with minimal frequency. Suen and Ary (1989) recommend using "occurrence agreement" procedure to compute percentage

agreement in cases of low frequency behaviors. The procedure was advised when the behavior occurs in fewer than 20% of the intervals, as was the case with every code for every participant in this study. To avoid artificial inflation, intervals in which the two raters agreed that no behaviors were coded were left out of the calculation. The percent agreement was calculated as follows:  $\text{occurrence agreements} / (\text{occurrence agreements} + \text{disagreements}) \times 100 \%$ . An “occurrence agreement” is counted every time both observers agreed on the presence a particular code. A “disagreement” is when raters disagree on the presence *or* absence of a code (Suen & Ary, 1989). To estimate interobserver agreement, occurrence agreements and disagreements were totaled separately for each code type. The percentage agreement was then calculated for each code. The mean percentage agreement across all variables was 82%. This was calculated using the summed occurrence agreements and disagreements across codes, not by averaging all the codes’ agreement percentages. Table 2 below lists the approximate frequency and associated percentage agreement for each code type across the reliability sample.

Table 2

*Mean Frequency and Percentage Agreement of Each Code Type*

Code	Mean Frequency	Percentage Agreement
Praise	19.33	85
Physical affection	4.33	80
Positive laughter	1.67	100
Allow request	4.00	100
Imitate	6.00	75
Describe	5.00	67
Positive gesture	0.00	-
Positive reference	4.00	75
Positive other	5.33	80
Yell	0.00	-
Reprimand	0.67	100
Threat	0.67	100
Time out	0.00	-
Deny request	6.33	83
Criticism	3.00	75
Negative physical	1.67	67
Negative gesture	0.00	-
Negative laughter	0.00	-
Negative other	0.00	-
Rule reminder	8.00	88

## RESULTS

Data for each of the eight dyads that participated in the study are presented below in graphical format. Graphs and tables are grouped according to the research questions to which they relate. The first set of graphs (Figures 1-8 below) provide data relevant to the first two research questions of the study, namely “What interaction ratios between mothers and young children naturally occur prior to ratio-based intervention?” and “Is brief instruction effective in causing a specified change in mothers’ observed interaction ratios with their child?”

For each participant a line graph depicts the mother’s number of positive and negative verbalizations across both observation phases. Because the frequency of codeable behaviors was relatively low, data have been grouped into 2-minute clusters. Therefore, each 16-minute observation period has eight data points. For each data point, the number of positives and the number of negatives have been plotted separately. An overall ratio was computed for each of the two phases by dividing the number of positives by the number of negatives for that phase. The ratio for each observation phase is shown as a horizontal line. It is important to note that this line is not a “best fit” line through the positive and negative data points, but rather a depiction of the observed ratio of positives to negatives for each 16-minute phase.

Graphs for participants in Group A (brief instruction) are shown first, followed by participants in Group B (brief instruction plus modeling, role play, and feedback).

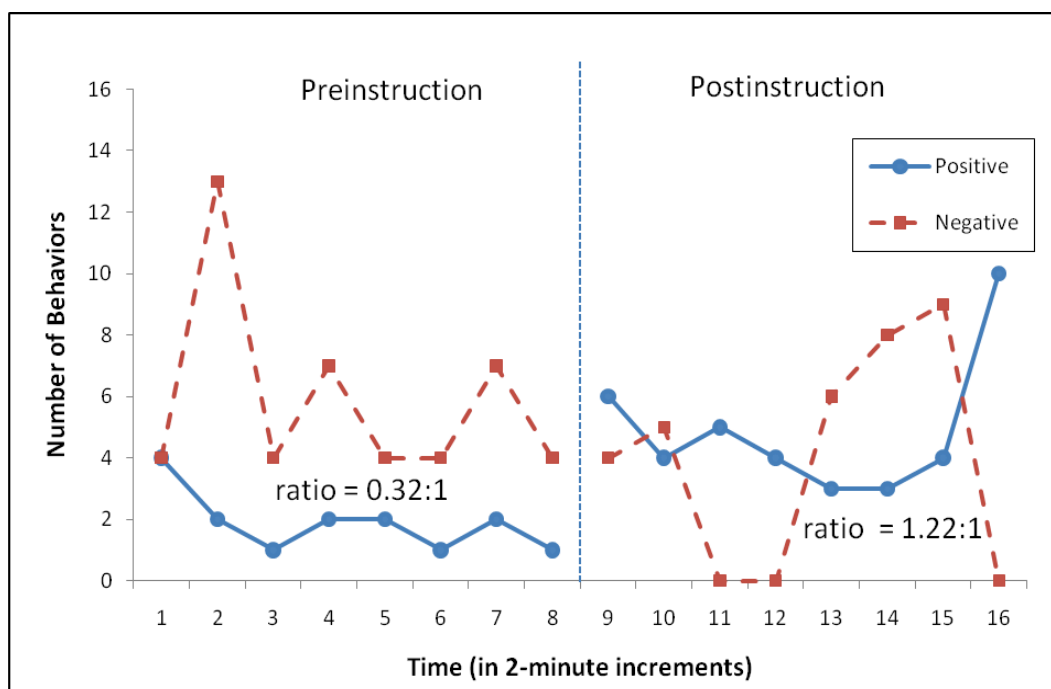


Figure 1. Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant A1.

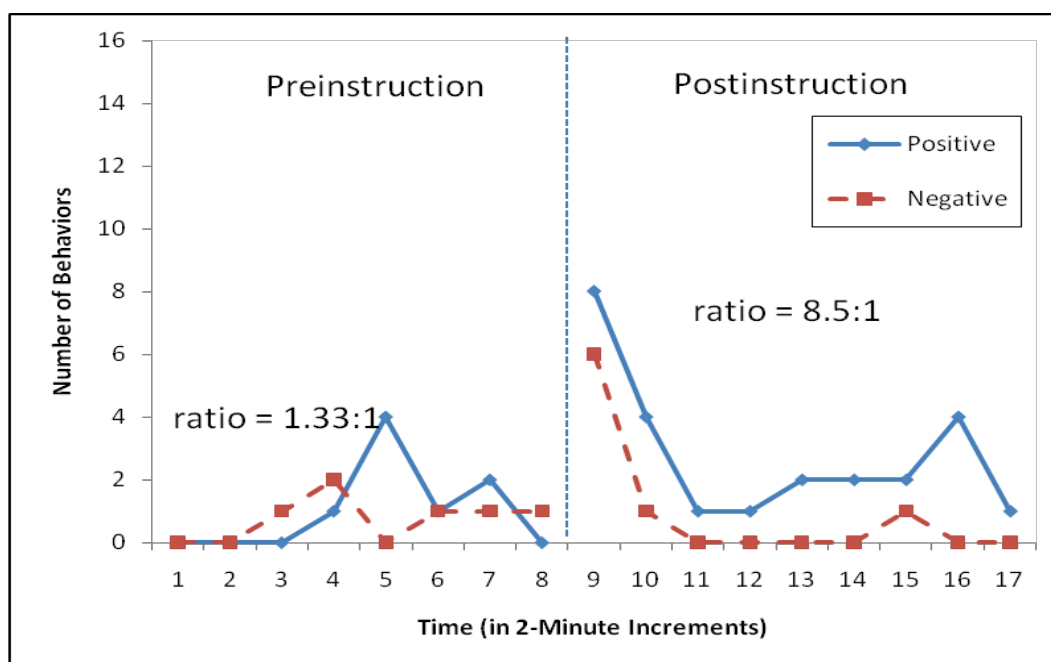


Figure 2. Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant A2.

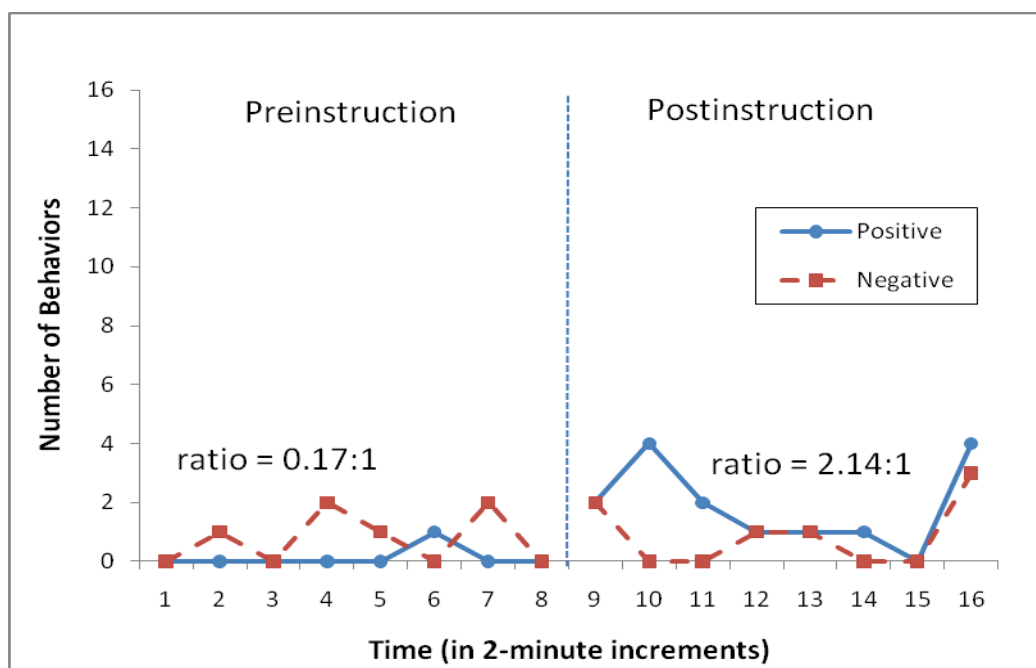


Figure 3. Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant A3.

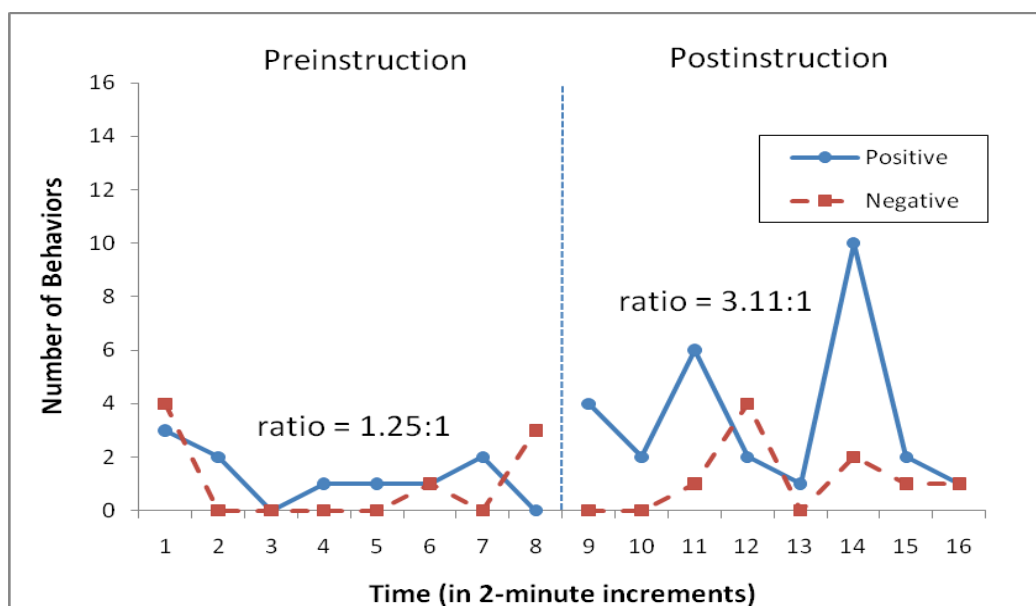


Figure 4. Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant A4.

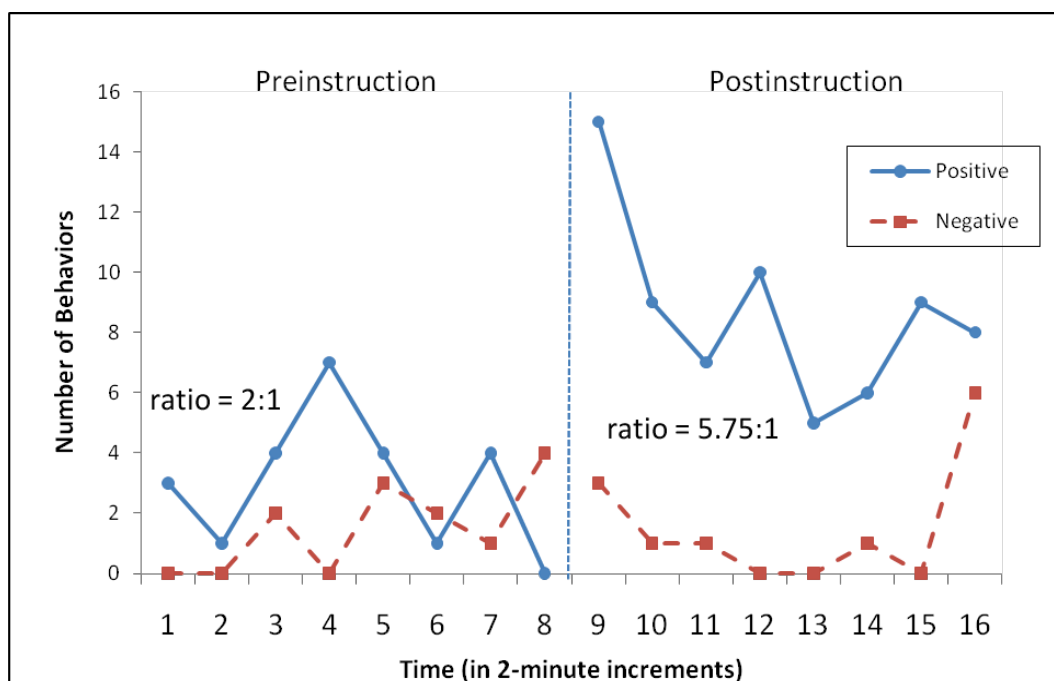


Figure 5. Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant B1.

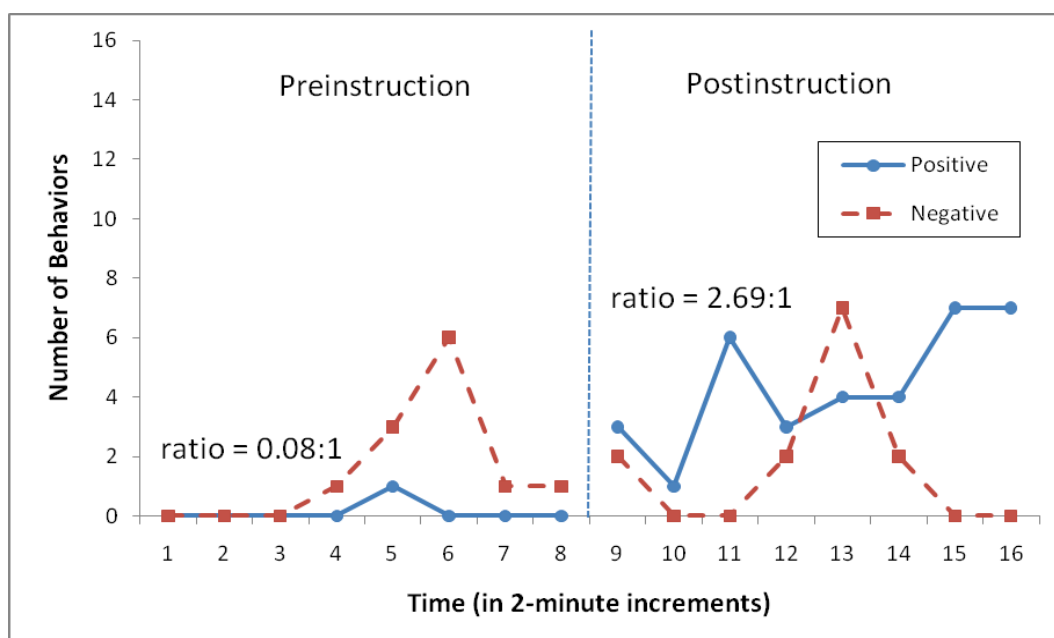


Figure 6. Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant B2.

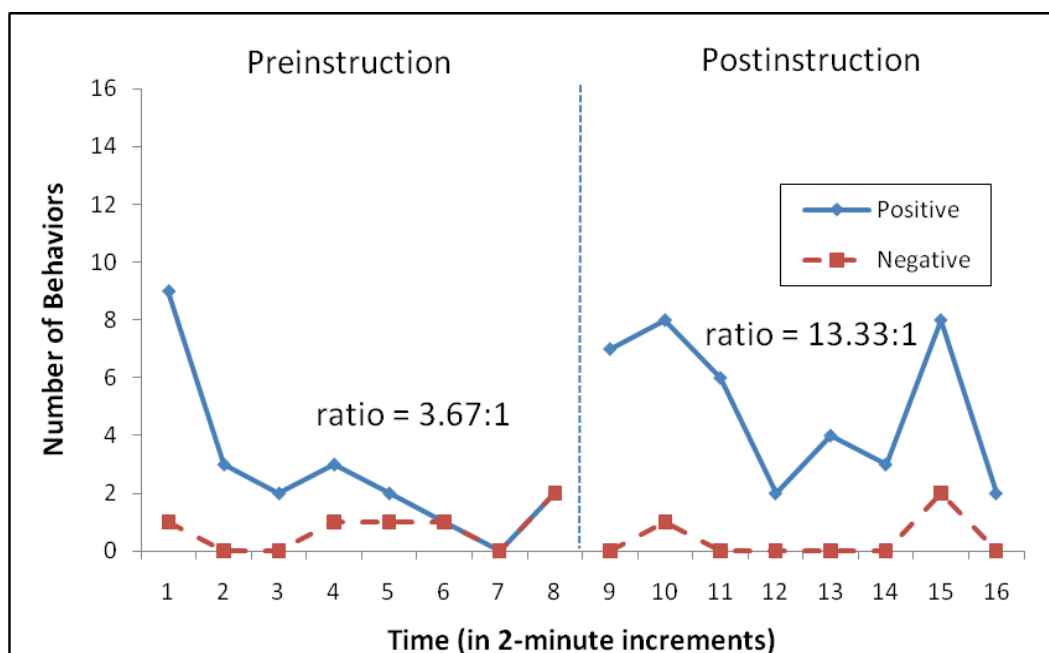


Figure 7. Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant B3.

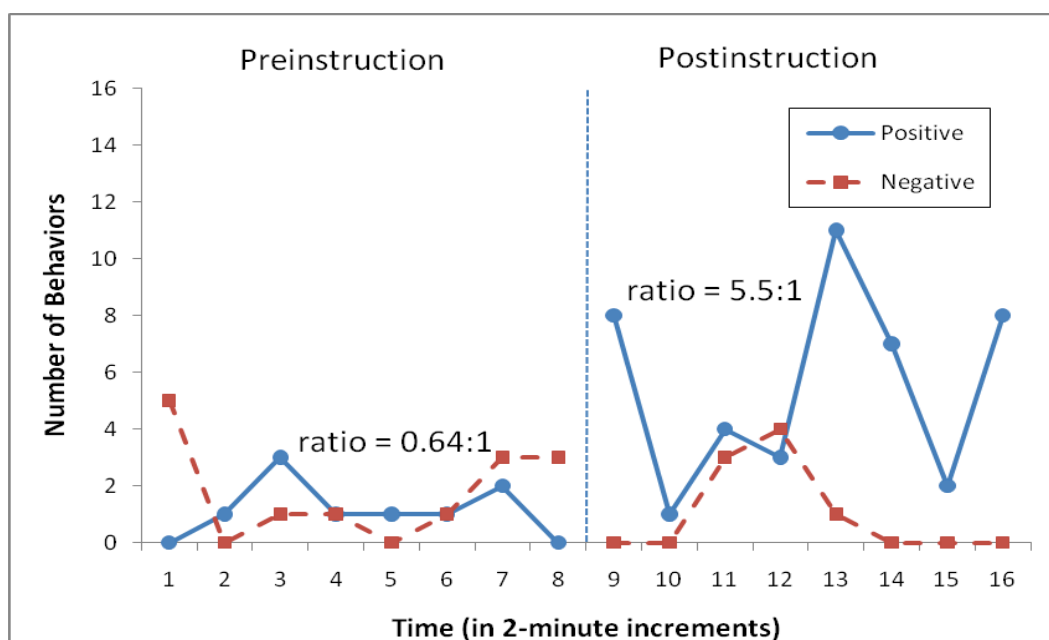


Figure 8. Number of positive and negative maternal behaviors and ratios during pre- and postinstruction phases for participant B4.



For group A (brief ratio instruction), preinstruction ratios ranged from 0.17:1 to 1.33:1. Preinstruction ratios for group B (brief ratio instruction plus modeling and role play) ranged from 0.08:1 to 3.67:1. During baseline, four of the mothers' number of negatives exceeded their number of positives (i.e., A1, A3, B2, and B4). All mothers had higher ratios during the postinstruction phase than during baseline, and all mothers' positives exceeded their negatives during the postinstruction phase. Of the eight dyads, four mothers (i.e., A2, B1, B3, and B4) met or exceeded the 5:1 ratio during the postinstruction observation phase. For both groups, instruction appears to have had a substantial impact on ratios.

Participants in both groups raised their ratio, though some did not reach the target 5:1 ratio. The third research question was "Which instruction method leads to closer approximation of 5 to 1 ratios--brief "advice giving," or behavioral parent training regarding ratios?" Comparisons of positives, negatives, and ratios between and within groups are presented below.

Table 3

*Changes in Number of Positives from Pre- to Postinstruction Phases*

Participant	Total positives: Preinstruction	Total positives: Postinstruction	Difference (Post - Pre)
A1	15	39	24
A2	8	17	9
A3	1	15	14
A4	10	28	18
B1	24	69	45
B2	1	35	34
B3	22	40	18
B4	9	44	35

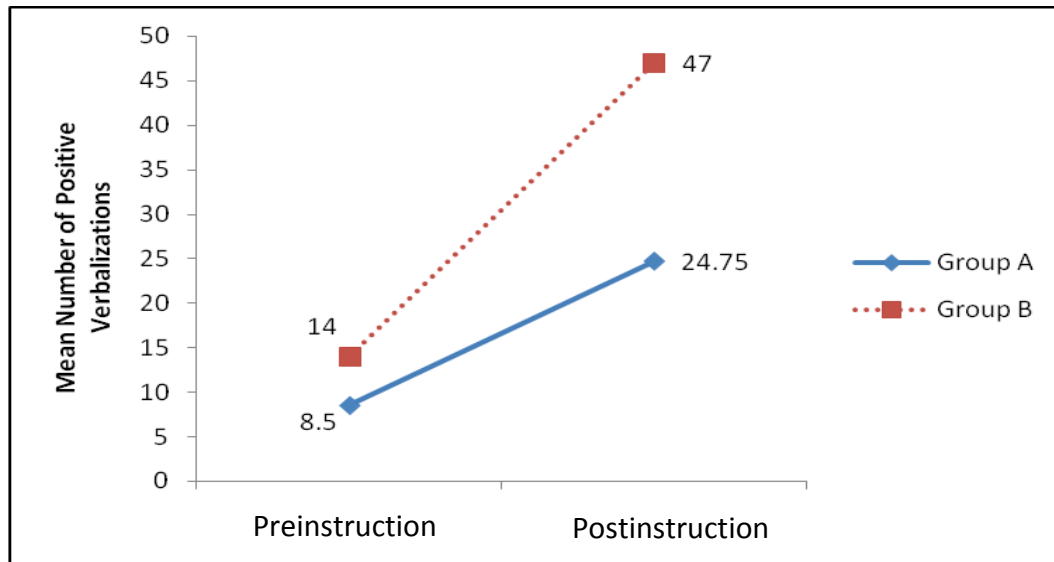


Figure 9. Positives during pre- and postinstruction phases: Group means.

Across groups, every participant in the study substantially increased her number of positives during the postinstruction phase relative to baseline. Positives were increased during the postinstruction phase at a greater magnitude for Group B compared with individuals in Group A.

Table 4

*Changes in Number of Negatives from Pre- to Postinstruction Phases*

Participant	Total negatives: Preinstruction	Total negatives: Postinstruction	Difference (Post - Pre)
A1	47	32	-15
A2	6	2	-4
A3	6	7	1
A4	8	9	1
B1	12	12	0
B2	12	13	1
B3	6	3	-3
B4	14	8	-6

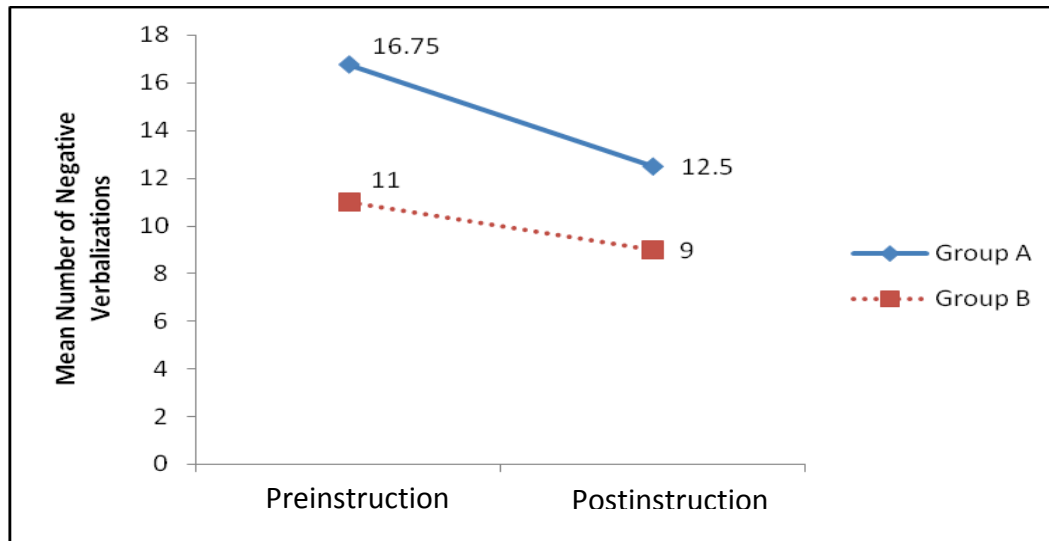


Figure 10. Negatives during pre- and postinstruction phases: Group means.

For participants in both groups, numbers of negative verbalizations remained relatively constant between pre- and postinstruction phases, compared with the concurrent change in positives. The change in negatives for four of the eight mothers (two in each group) was within plus or minus one verbalization.

Table 5

*Changes in Ratios from Pre- to Postinstruction*

Participant	Ratio: Preinstruction	Ratio: Postinstruction	Difference (Post - Pre)
A1	0.32 : 1	1.22 : 1	0.9
A2	1.33 : 1	8.5 : 1	7.17
A3	0.17 : 1	2.14 : 1	1.97
A4	1.25 : 1	3.11 : 1	1.86
B1	2 : 1	5.75 : 1	3.75
B2	.08 : 1	2.69 : 1	2.61
B3	3.67 : 1	13.33 : 1	9.66
B4	0.64 : 1	5.5 : 1	4.86

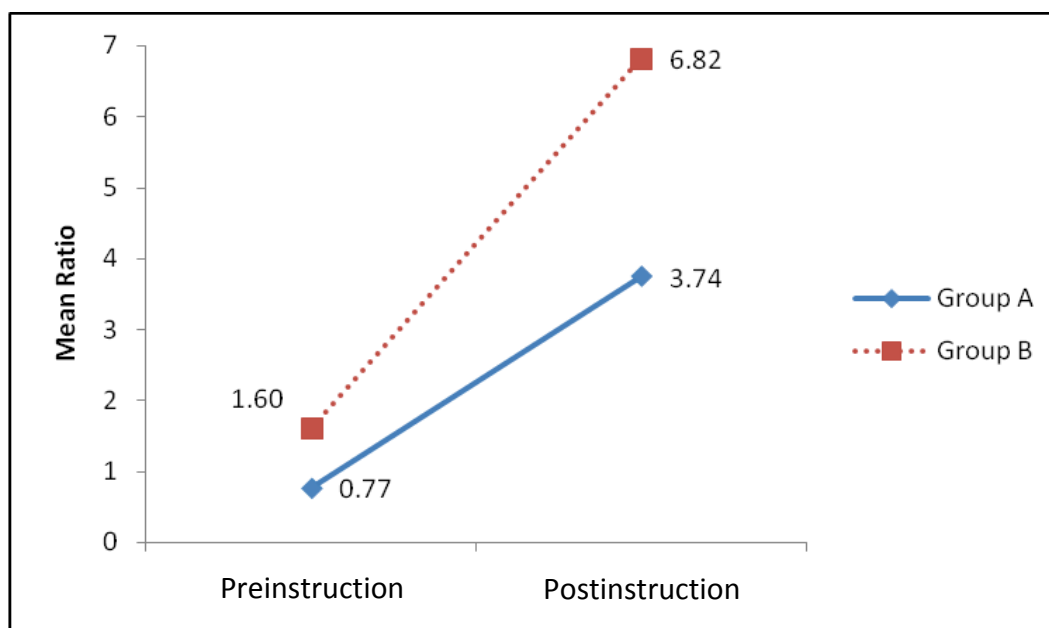


Figure 11. Ratios during pre- and postinstruction phases: Group means.

Graphical inspection of the data indicated that mean preinstruction ratios were approximately comparable for Group A (mean ratio = 0.77) and Group B (mean ratio = 1.6). Participants who were exposed to modeling and role play as part of the brief ratio instruction (Group B) showed a greater overall magnitude of change in their ratio between baseline and the postinstruction phase.

Figures 12-19 below provide insight into the study's final research question, that is, "Which variable(s) do mothers manipulate to achieve a higher ratio?" Each graph shows the total number of positive and negative maternal behaviors *per code type* for the preinstruction and postinstruction phases. Code types for which no behaviors were coded for the dyad are not shown on the graphs.

Examination of the changes in code type from pre- to postinstruction phases revealed that praise accounted for the majority of verbalizations coded positively for each

mother except for participant B3. For each participant except B3, the number of positive interactions increased for a majority of the code types.

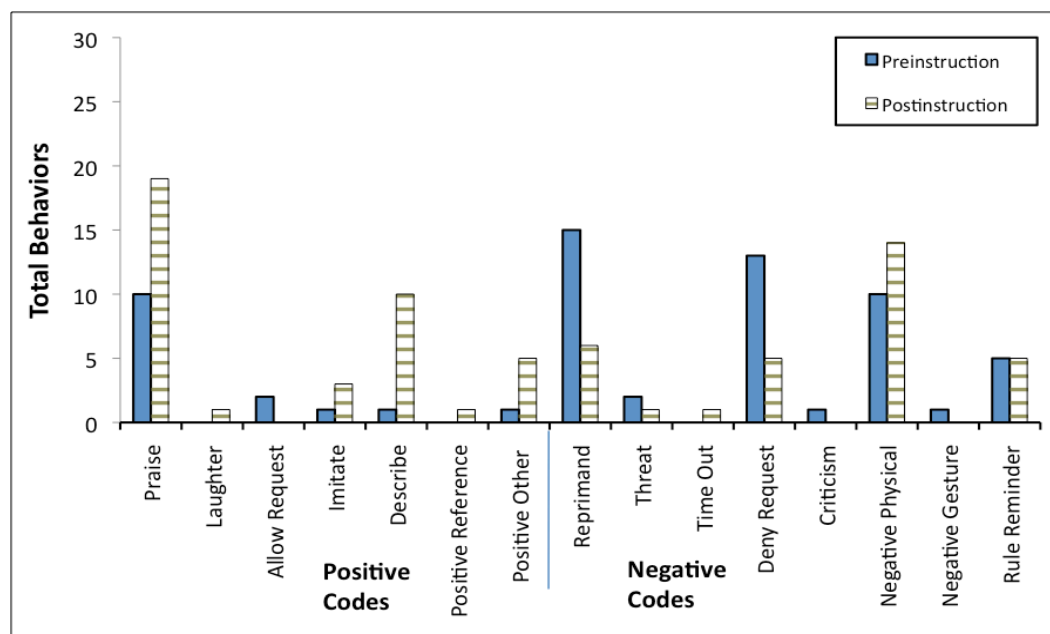


Figure 12. Total maternal behaviors per specific positive and negative codes during pre- and postinstruction phases for participant A1.

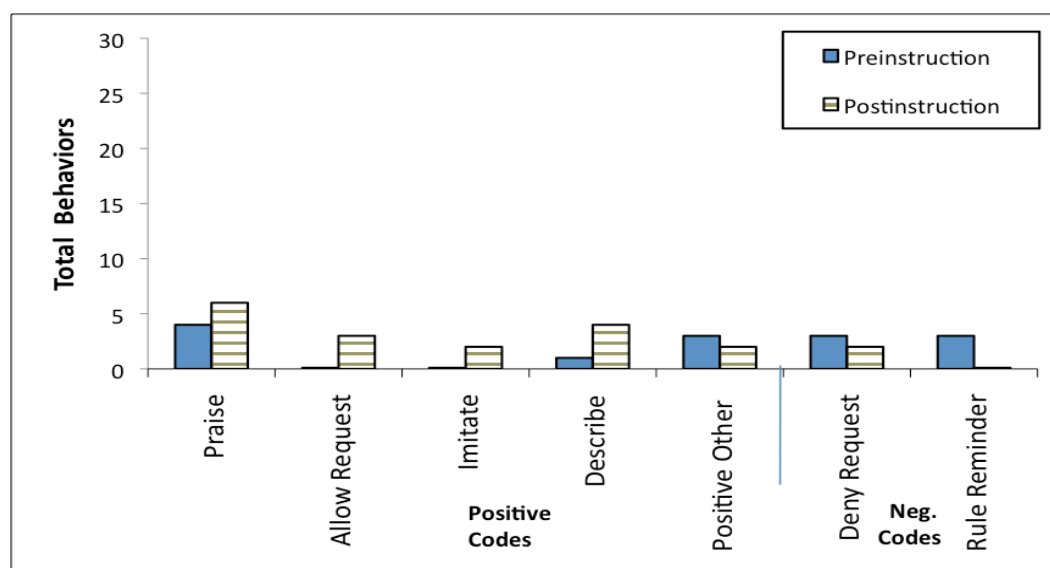


Figure 13. Total maternal behaviors per specific positive and negative codes during pre- and postinstruction phases for participant A2.

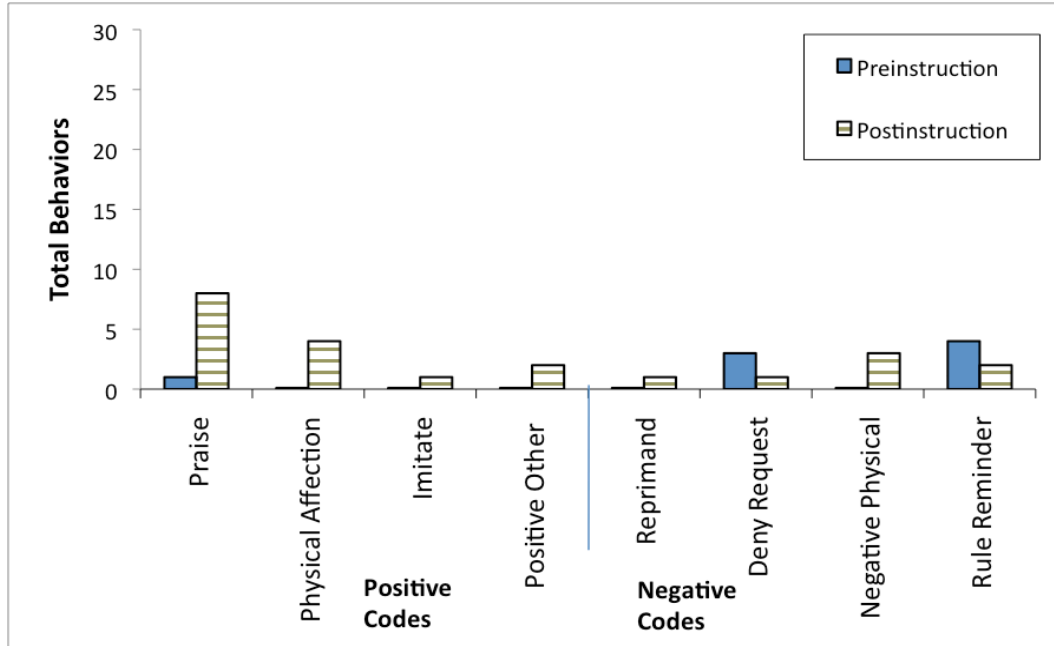


Figure 14. Total maternal behaviors per specific positive and negative codes during pre- and postinstruction phases for participant A3.

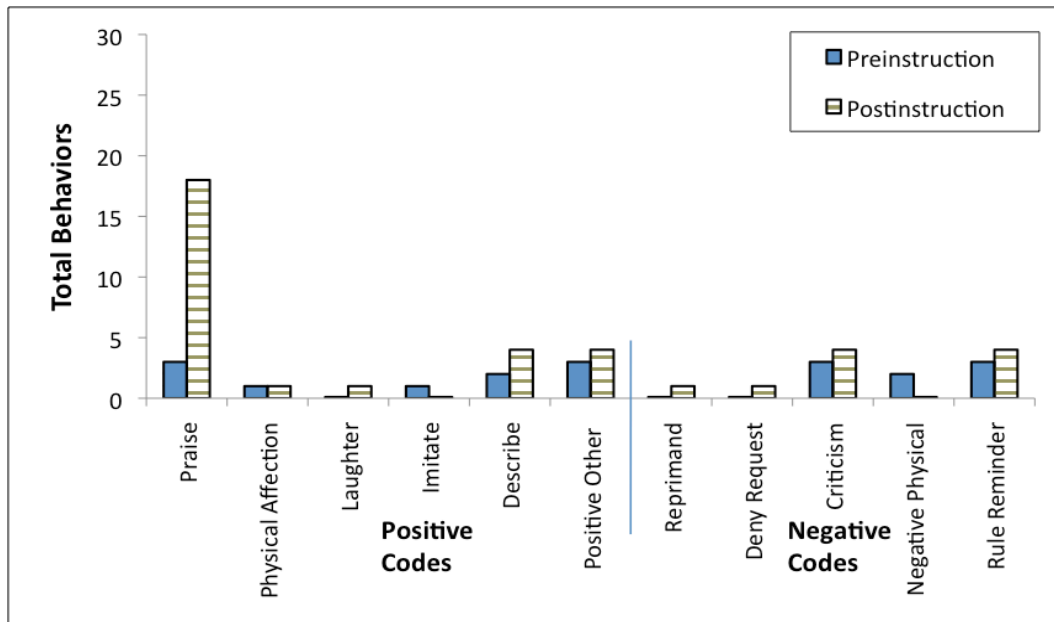


Figure 15. Total maternal behaviors per specific positive and negative codes during pre- and postinstruction phases for participant A4.

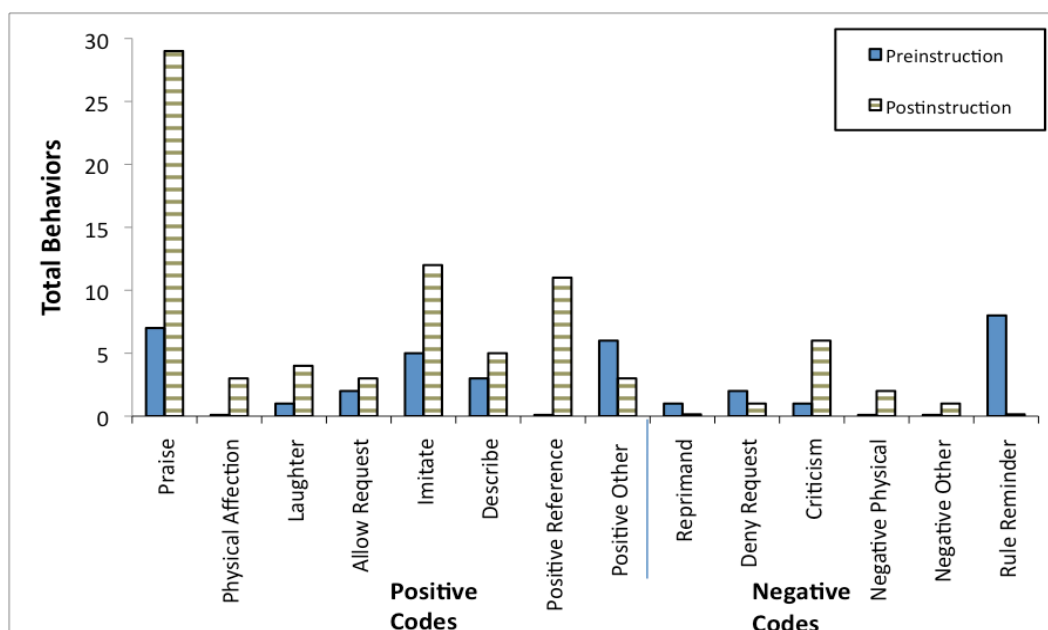


Figure 16. Total maternal behaviors per specific positive and negative codes during pre- and postinstruction phases for participant B1.

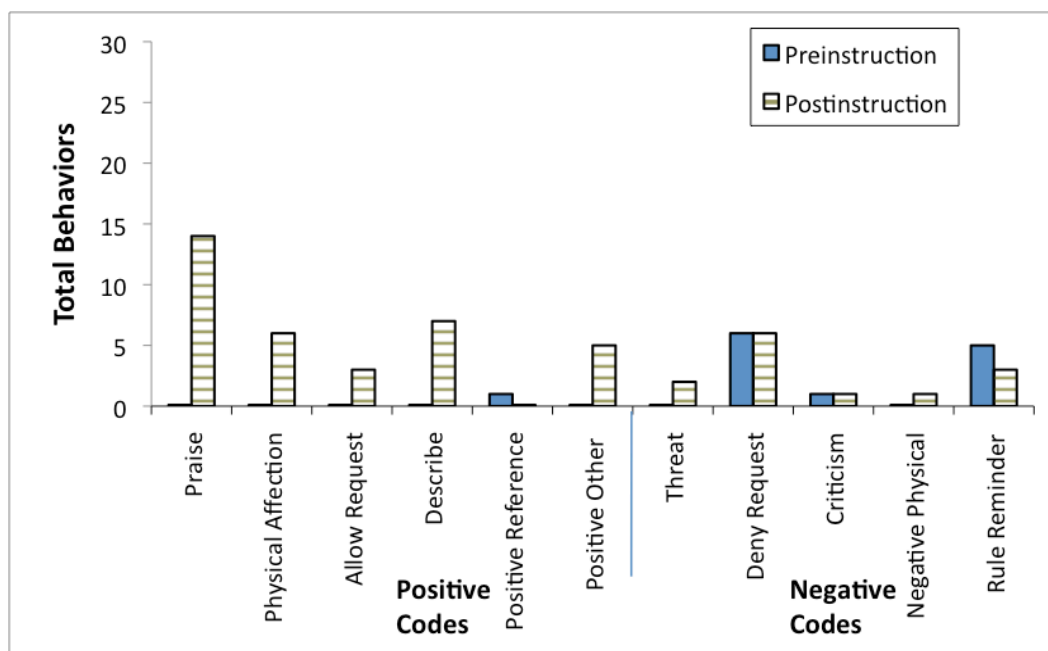


Figure 17. Total maternal behaviors per specific positive and negative codes during pre- and postinstruction phases for participant B2.

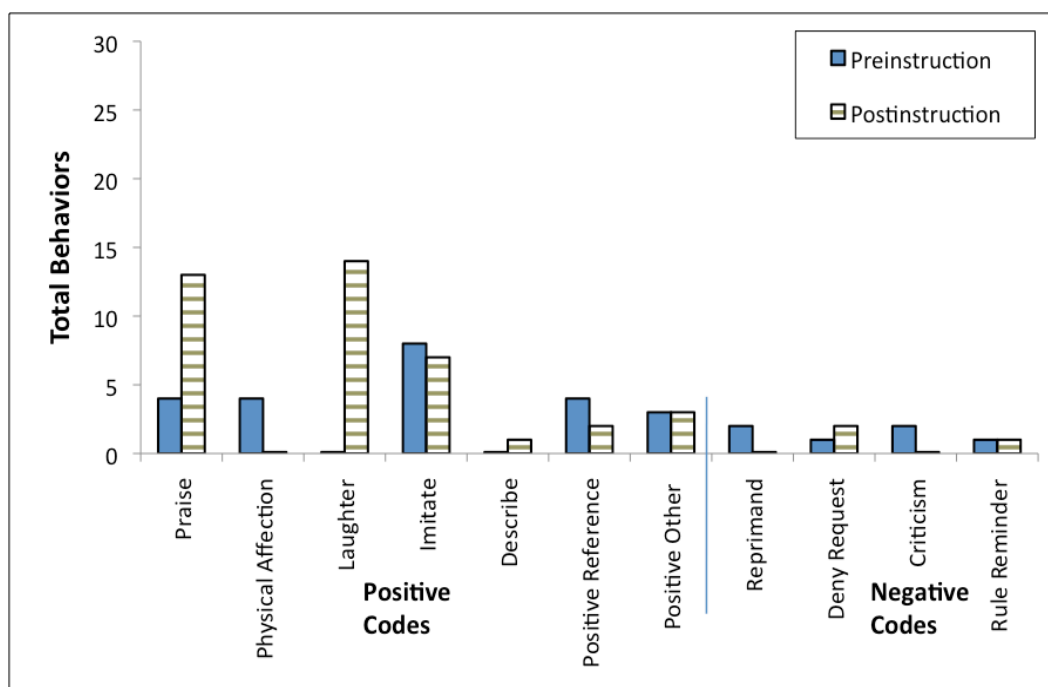


Figure 18. Total maternal behaviors per specific positive and negative codes during pre- and postinstruction phases for participant B3.

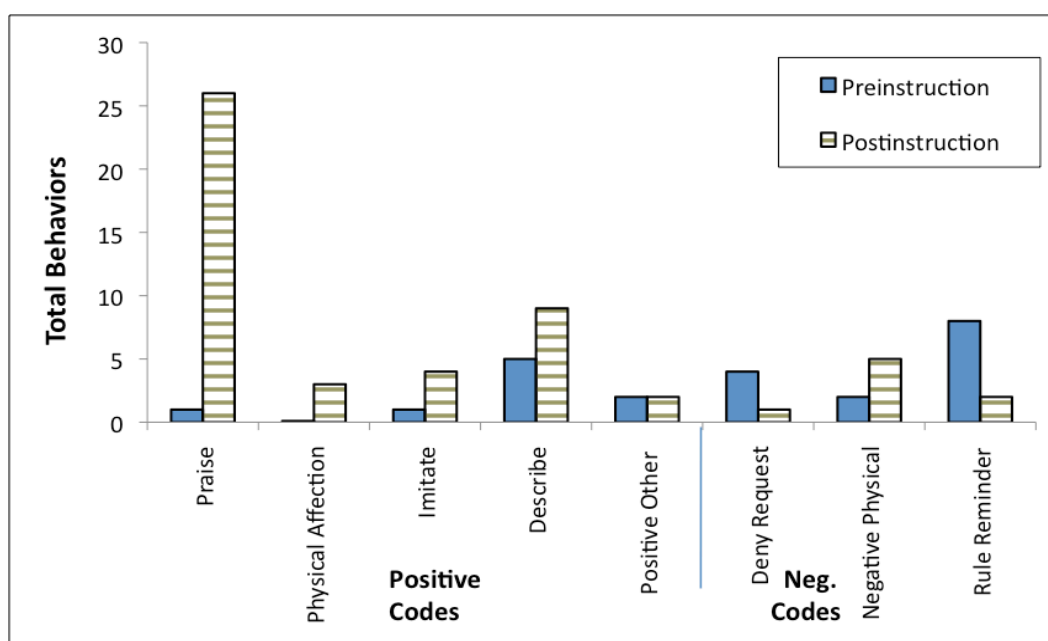


Figure 19. Total maternal behaviors per specific positive and negative codes during pre- and postinstruction phases for participant B4.



## DISCUSSION

### **Baseline Ratios**

As no mention of ratios was made to participants prior to the observation, the first 16-minute phase provided data about *baseline* ratios, helping to answer the study's first research question, namely "What interaction ratios between mothers and young children naturally occur prior to ratio-based instruction?" On the whole, mothers in the sample displayed strikingly low baseline ratios. Half of the mothers (participants A1, A3, B2, and B4) had baseline ratios that were less than one to one—in other words, negatives exceeded positives. The other four mothers had baseline ratios of 1.3:1, 1.25:1, 2:1, and 3.67:1, respectively. Across all participants, the mean baseline ratio was 1.12:1.

Previous work on baseline ratios can help shed light on these findings. Baseline ratios between mothers and children were reported by Hart and Risley (1995), described as "feedback tone" (computed by dividing the number of positive verbalizations by the number of positive plus negative verbalizations). Based on extensive in-home observations, Hart and Risley found baseline ratios of 0.5:1 to 6:1 in 42 families along a broad range of backgrounds (unfortunately mean and median ratios were not provided). Ratios at the level found in the current sample would be at the low end in the context of Hart and Risley's findings. It may be that the baseline ratios of parents and young children overall are lower than previously thought, and lower than other types of relationships.

Because of parents' roles as teachers and rule-enforcers, a relatively large amount of feedback is to be expected, compared, to the amount of feedback shared between two adults. The number of "necessary negatives" is likely to be higher, particularly with young children, creating a more negative tone and a lower ratio. Baseline ratios of the sample of subclinical families in the current study averaged approximately 1:1. According to Gottman and Levenson (1992), ratios of 1:1 indicate dissolving marriage relationships! Clearly the dyads in this sample were not similarly distressed. This carries an implication for the prescription of "ideal" interaction ratios—that suggested ratios may need to be adjusted for parents and young children because everyday ratios may be lower.

### **Effectiveness of Brief Ratio Training**

A primary focus of the study was to determine if mothers could reach a 5:1 ratio following a brief period of ratio instruction. As shown in Table 5 above, four of the eight participants (A2, B1, B3, and B4) exceeded the 5:1 ratio following ratio instruction. The other four participants all increased their ratios, but not to the specified 5:1 level.

Of further interest was which *type* of brief instruction led to greater improvement in ratios. Two types of brief instruction were examined. Group A received brief ratio instruction similar to ratio advice found in parenting books or articles. Group B received the same instruction with the additional components of modeling, role play, and feedback.

On the whole, Group B yielded more positive results than Group A. Seventy-five percent of participants in Group B reached the target ratio, compared to 25% of

participants in Group A. Because individuals in Group B received more detailed instructions, it is intuitive they would display higher ratios following the instruction period compared with Group A. Participants in Group B received individualized feedback about their role-played use of positives and negatives, which may have helped clarify the definitions of “positive” and “negative” interactions.

Ratio advice in this study, as in real life, did not take baseline ratios into account—the target postinstruction ratio was 5:1 regardless of the dyad’s starting ratio. The small-n design employed in this study called for intraparticipant comparisons; each participant’s baseline ratio served as their own control. Therefore, *magnitude* of change is an important contextual consideration in interpreting pre-/postinstruction ratios. Individuals in Group B showed greater magnitude changes than those in Group A. The average ratios for Group B went from 1.6 during baseline to 6.82 during the postinstruction phase. The average ratios in Group A showed a less dramatic rise, from 0.77 during baseline to 3.74 during the postinstruction phase.

These findings have implications for clinical practice. Although half the participants did not reach the target ratio, results indicated that even when parents started with a large deficit, they were able to make substantial changes in a positive direction. This was especially true if the brief training included modeling, role playing, and feedback. Thus, current data suggest that ratio advice may lead to positive change, and more involved advice may yield greater magnitude positive change.

### **Mothers' Manipulation of Positives and Negatives**

In clinical practice, recommendations to parents are not commonly framed in the context of *ratios*, but quite similar advice is given routinely. In behavioral parent training, parents are taught how to boost both the quality and the quantity of positive interactions. They are also advised to ignore minor misbehaviors, and are coached on preferred ways to handle necessary negative interactions. None of the participants were instructed to boost positives or minimize negatives; they were only given examples of positive and negative interactions. The study's final research question, "Which variable(s) do mothers manipulate to achieve a higher ratio?", afforded the opportunity to see how mothers adjusted positives and negatives without coaching.

Across groups, every parent manipulated ratios primarily by boosting positives, and mothers in the Group B boosted positives at a much greater rate. Within the context of the project's instructions, participants maintained a relatively stable level of negatives between the pre- to postinstruction phases. Four participants' (A3, A4, B1, and B2) number of postinstruction negatives was unchanged or within one compared to their number of preinstruction negatives.

With a target ratio in mind, it is possible that individuals may boost positives in a repetitive and/or insincere manner. They may minimize negative interactions by ignoring misbehaviors that should not be ignored (e.g., noncompliance, aggression). This project did not evaluate the "quality" of positives and negatives used by participants, but afforded an opportunity to investigate what parents do naturally to move ratios in a specified direction. If later data shows a tendency for parents to adjust ratios

inappropriately, the argument for presenting ratio advice *in clinical contexts* will be strengthened.

The fact that boosting positives was the main strategy for all mothers in the study may indicate a bias on the part of parents for positive strategies overall. Positive components of behavioral parent training (e.g., “catch your child being good,” “child’s game”) are taught first and stressed heavily. This approach makes sense, if, as indicated by these data, this is the direction mothers were already inclined to go.

Participants’ large increases in positives may also reflect an impression that positives are more easily manufactured and less dependent on the observed behaviors of the child. Admittedly, parents may have approached ratio manipulation differently in a context with less-specific rules, in which minimizing negatives may have seemed more acceptable. However, at virtually any time during the course of the observation sessions, parents could say or do something meaningfully positive.

### **Limitations**

As an initial investigation, this project was designed as a small-n study. Due to the small size of the sample, data may be of limited generalizability, given that it is difficult to assess how well this sample represented the population. Were the study to be replicated with larger samples, sample recruitment could be designed to ensure accurate population representation, and data could be considered more reliable. A future study could collect more demographic data about the families, including socioeconomic status

and mothers' level of education. Future research could also benefit from assessing the social validity of ratio advice during debriefing.

To establish a research basis for psychologists to offer ratio advice in clinical settings, data from a clinical sample will need to be collected. Also, because optimal ratios likely change over time, foundational data should be gathered from children of a wider range of ages.

While intended to mimic a home environment, the research setting, of necessity, differed from home in several ways. First, in a home setting, mothers may allow themselves more breaks and a greater level of interaction with their children than was permitted in the study. Next, playthings available at home may be less mundane than the toys available in the observation room. Boredom with the available toys may have led to higher levels of misbehavior (and lower ratios) than would be seen at home.

Furthermore, most homes have forbidden objects (e.g., tools, electronics, knives, etc.), but the forbidden items in the study may have been more attractive than off-limits items in the home. Also, mothers were not provided any justification for why children were to avoid forbidden objects, only that "those are the rules." Mothers accustomed to providing rationales for behavioral expectations may have been less convincing to their children than they would be at home. Finally, because the participants knew they were being watched and evaluated, social desirability may have influenced mothers to be more positive than usual, driving up ratios.

It is probable that there was some discrepancy between the researchers', the mothers', and the children's definitions of "positive" and "negative." Furthermore,

parent-child dyads differ from one another in terms of communication style and learning history. No one-size-fits-all code exists that can account for these differences, and no method of reducing observed behaviors to discrete code types can be considered perfectly valid. The coding scheme used here was devised by the researchers with input from extant coding systems. No published codes were found with specifically dichotomous “positive” and “negative” codes for overt behaviors for parents and children. In the creation of the code, the researchers attempted to operationally define behaviors based upon their topography without making assumptions about their function. In other words, behaviors were assigned to a positive or negative category based simply on how they looked. However, topography may not match the function, or, the way in which the stimulus was perceived. For example, a smile looks positive and would be coded as such, but a smile may indicate something else, like nervousness or discomfort. Coding from a functional perspective would have required detailed individualized functional analysis of each dyad, and was outside the scope of this project.

Another direction for future research could be exploring the differential impact on parental ratios of explicit ratio advice versus advice to simply boost positives. Because boosting positives, not minimizing negatives, was the main approach taken by participants in this study, it may be the case that simply recommending increased positives could lift ratios to desired levels.

The relative brevity of observation sessions could also be among the study’s weaknesses. Ratios were derived from 16-minute observation sessions. In a naturalistic setting, ratios would be based on longer spans of time. It is possible that mothers would

have improved their ratios had they been provided more time in which to “balance out” negative interactions with positives.

### **Future Directions**

Many possible directions for future directions are indicated by this initial study. Having found that parents are able to increase ratios in a specified direction, often achieving a target ratio, further research is needed to determine whether ratio-based interventions have positive effects on behavior and relationships. Such studies could rely on experimental manipulation of ratios, using observed and reported levels of child behavior as outcome measures. Self-report data from mothers could be gathered as indicators of changes in relationship quality. Observations could be conducted in the home to minimize effects of the laboratory environment. Eventually, a “best” ratio (or more likely, a range of ratios) may be determined that more closely suits parents and young children than does 5:1. A research-validated target ratio could be a valuable tool in the hands of psychologists, as a way to present components already included in behavioral parent training.

This study provides early indicators that ratios are most achievable when instruction includes examples, modeling, role playing, and feedback. Other methods of conveying ratio advice could be investigated. One possibility would be to have parents generate their own definitions of positives and negatives, with input from a researcher. Parent-defined positives and negatives could be used as the basis for coding schemes that would likely possess greater validity than the coding technique used here. Personalizing



ratio instruction in this manner would likely make the implementation of ratios more meaningful and sustainable.

If parents are to apply ratio advice with fidelity, advice will likely need to include a suggested length of time upon which to base the computation of ratios. Research could be conducted to determine the increment of time (e.g., hourly, daily, weekly) that will be the most manageable for parents, leading to the greatest resultant increase in ratios. Studies could include investigations of optimal “cueing” procedures for helping parents stay on track with their ratios. These could include timed audio reminders in the form of beep tapes, keeping paper-and-pencil tallies, or visual reminders in the home.

## CONCLUSION

Initial data were collected from a community sample regarding mothers' use of positive/negative interaction ratios with their young children in a laboratory setting. Baseline observations were followed by brief ratio instruction in which parents were asked to maintain a 5:1 ratio during the second observation phase.

All participants improved their ratios; half the sample achieved the target ratio. Individuals who received basic ratio instruction in a manner similar to the way instruction is presented in a clinical context improved their ratios more than those who received only basic ratio instruction, similar to what may appear in lay publication. It is plausible that a small effect may come from exposure to printed lay advice; however, it appears that much greater effects came from delivering advice from the context of a professional model of advisement.

Parents in the sample operated at low baseline ratios (approximately 1 to 1). If this ratio reflects the general population, it may illustrate a need for greater parental instruction regarding the effective use of positive and negative interactions, whether or not the instruction is presented in terms of ratios.

It is possible that a "best" ratio (or range of ratios) may be advisable for parents. This study found early indications of parents' ability to follow ratio instructions. Further research is needed to establish the impact of ratios on child behavior and parent-child relationships before ratio advice is disseminated.

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## APPENDICES

Appendix A:  
Brief Ratio Instruction Script

(Begin with 5 minutes of small talk, then transition into script):

“We’re interested in studying interactions between mothers and young children. Research has shown that *ratios* of positive and negative interactions are important in some kinds of relationships. The ratio is the number of positive statements or actions compared to the number of negatives: 5 positives for every 1 negative has been widely recommended. For example, couples who maintain a 5 to 1 ratio are happier and have more stability in their marriages. Teachers who have a high ratio with their students report fewer behavior problems in the classroom. We’re testing it with moms and kids to find out if a higher ratio could also strengthen *parent-child* relationships. The marriage and education research has shown that using purely positive approaches are ineffective. In parent-child relationships, some negatives are necessary to keep kids on track and to ensure their safety.

In the second half, we’re going to ask you to monitor your interactions with \_\_\_\_\_. We’d like you to keep track in your head of how many positive and negative things you say and do. Positives could be things like praise, hugs, rewards, or saying “yes” to your child’s requests. Examples of negatives could be disciplining your child, yelling, or saying “no” to requests. If you can, we want you to consciously say or do 5 positive things for every 1 negative. We’d like you to get as close to 5 positives to 1 negative as you can, without exceeding 5 to 1. The “rules” are the same in the second half: everything on the shelves is “off limits”. Remember, we want you to balance each negative with 5 positives. Do you have any questions?”

#### Standardized responses to anticipated questions

Question: Should I just ignore when my child misbehaves? (*or other questions about minimizing negatives*)

Response: We’d like you to address your child’s behavior in whatever method you feel is appropriate, while striving to maintain a 5 to 1 balance.

Question: Can I keep a tally of my positives and negatives?

Response: We’d like you to keep track in your head as best you can.

## Appendix B:

Brief Ratio Instruction Plus Modeling, Role Play, and Feedback



“We’re interested in studying interactions between mothers and young children. Research has shown that *ratios* of positive and negative interactions are important in some kinds of relationships. The ratio is the number of positive statements or actions compared to the number of negatives: 5 positives for every 1 negative has been widely recommended. For example, couples who maintain a 5 to 1 ratio are happier and have more stability in their marriages. Teachers who have a high ratio with their students report fewer behavior problems in the classroom. We’re testing it with moms and kids to find out if a higher ratio could also strengthen *parent-child* relationships. The marriage and education research has shown that using purely positive approaches are ineffective. In parent-child relationships, some negatives are necessary to keep kids on track and to ensure their safety.

In the second half, we’re going to ask you to monitor your interactions with \_\_\_\_\_. We’d like you to keep track in your head of how many positive and negative things you say and do. Positives could be things like praise, hugs, rewards, or saying “yes” to your child’s requests. Examples of negatives could be reprimanding or disciplining your child, yelling, or saying “no” to requests. If you can, we want you to consciously say or do 5 positive things for every 1 negative.”

“We’re going to give a quick demo. While you watch, I’d like you to try to pick out positive and negative interactions.”

Demonstration: (one researcher acts as the parent, the other researcher acts as the “Child” is making a tower out of blocks independently while the “parent” is doing work).

“Parent”: “Hey, \_\_\_\_\_.” (While giving *thumbs-up*) “I like that tower. You’re good at that.”

“Child”: “Will you come build one with me?”

“Parent”: “No, I can’t right now.”

“Child”: “Maybe later?”

“Parent”: “Okay, maybe later.” (Pats child’s back).

“Child”: “When are we gonna leave?”

“Parent”: “Pretty soon.”

Researcher asks parent: “How many positives did you count?” “What were they?”  
“How about negatives?”

“Now I’ll ask you to be the “parent” and role play with \_\_\_\_\_ (researcher) as if they were your child. Try to respond to \_\_\_\_\_’s behavior with whatever interactions seem natural, and try to hit the 5 positives to 1 negative if you can.”

Role play: (the “child” researcher from the demo acts as the child again).

“Child” plays independently until parent initiates an interaction. During the course of the interaction, the “child” starts throwing blocks into the garbage can. The “child” responds appropriately if/when the parent gives an instruction to stop.

Feedback: Researcher comments on the interaction just observed, highlighting appropriate positives and negatives. Brief questioning about how the parent selected interactions and how they kept track of the ratio.

“We’re going to go back into the play room. For this last part, we’d like you to get as close to 5 positives to 1 negative as you can, without exceeding 5 to 1. The “rules” will be the same: everything on the shelves is “off limits”. Remember, we want to you balance each negative with 5 positives. Do you have any questions?”

#### Standardized responses to anticipated questions

Question: Should I just ignore when my child misbehaves? (*or other questions about minimizing negatives*)

Response: We’d like you to address your child’s behavior in whatever method you feel is appropriate, while striving to maintain a 5 to 1 balance.

Question: Can I keep a tally of my positives and negatives?

Response: We’d like you to keep track in your head as best you can.

### Appendix C:

#### Instructions to Mothers Prior to Entering Observation Room

“In the playroom, you’ll find a large table and chairs. We’ll ask you to sit at the table throughout the observation, while your child plays on the floor. After you’ve completed the questionnaire, please remain busy at the table. Even though you’ll be busy, feel free to give your child feedback.

You’ll see an assortment of toys on the floor, as well as some toys on some shelves and a small table. Your child is welcome to play with anything on the floor, but items on the shelves as well as a dangly kite hanging from the ceiling are off-limits. The large table and chairs are also off-limits, as is your lap. If your child touches any of the off-limits items, we want you to respond the way you would at home when your child breaks a rule, short of spanking. We also ask that you remain in the room until the observation ends, unless there is an emergency.”

#### Appendix D:

Instructions to Children upon Entering Observation Room

“You get to play with some toys in here for awhile.

You can play with anything on the floor. But you’re not allowed to touch the dangly kite or any toys on the shelf or the little table.

The big table and chairs are off limits, too.

I’m going to be at the table doing some work.

I want you to play by yourself so I can get it done.”

Appendix E:  
Debriefing Script

“Thank you for participating in our research project. As you may have guessed, we were mostly watching your behavior, not your child’s. You did a nice job trying to follow the study’s guidelines, even when it seemed hard. What was it like for you during this second half?

Let me tell you a bit more about what we’re doing. Like I said before, we are trying to learn more about the ways ratios apply to relationships between parents and young children. Research has found the 5 to 1 ratio to be important in marriage relationships. We do not yet know if the 5 to 1 ratio works in a similar way for parents and kids. This study is an early step in trying to answer that question. What strategies did you use to try to hit the 5:1 ratio?

What we do know is that finding ways to interact positively with your child strengthens relationships and promotes good behavior. Some parents find it difficult to maintain a high level of positive interactions. Sometimes it can be difficult to find things to be positive about, and parents can also struggle in coming up with ways to use positives that don’t sound too robotic. We have a one-page handout that we’re giving to all parents who come in. It has some tips for creative ways to use praise, and some ideas about how to ignore some of the minor misbehaviors we see in our kids.

Do you have any questions about our project?

Thank you for coming.”



Appendix F:  
Coding System for Parent Behaviors

## POSITIVE CODES

1. **PRAISE**  
Def: Any evaluative statement referring to child's prior, ongoing, or future behavior that is positive or shows approval.  
Examples: "Good job", "I like the way you're \_\_\_\_\_", "Wow!", "Thank you for \_\_\_\_\_", "You did that fast"
2. **PHYSICAL AFFECTION**  
Examples: Hugging, Kissing, High five, Ruffle child's hair, Pat on the back, "Knuckle up"
3. **POSITIVE LAUGHTER**  
Def: Parental laughter in response to a positive cue (verbalization or action) from the child.  
Examples: Parent laughs following child's action or verbalization, or parent laughs in response to child's laughter.
4. **ALLOWING REQUESTS**  
Def: Parent responds affirmatively when child asks for an object or a privilege. (Response can be verbal or gestural). Parental compliance with child's command is also coded here. Affirmative answers to neutral questions are not coded.
5. **IMITATION**  
Def: The parent verbally or motorically copies the child's speech or behavior within 5 seconds.  
Examples: Child: "This is my neat fort" --- Parent: "It is neat.", Parent plays with toy in the same way as child.
6. **DESCRIPTION**  
Def: Verbal description of the child's appropriate behavior.  
Examples: "You're sticking the red blocks together", "I see you putting the puzzle pieces in place".
7. **POSITIVE GESTURES**  
Examples: Clapping, Thumbs-up
8. **POSITIVE REFERENCE**  
Def: Parental use of a "term of endearment" in place of child's name in the context of a verbalization not coded elsewhere.  
Examples: "Honey", "Sweetie", "Baby", "Darling", "Dear", etc.
9. **POSITIVE OTHER**  
Def: Any verbalization or action not coded elsewhere which is delivered in an obviously positive tone.  
Example: An expression of empathy, such as "I know this is hard" or "You've had a tough day."

### NEGATIVE CODES

10.    **YELLING**  
Def: The parent raises their voice to the child, in an obviously negative manner.
  
11.    **REPRIMAND**  
Def: Any verbalization meant to get the child to STOP a behavior. Must include the word “don’t” or “stop”.  
Examples: “Stop \_\_\_\_\_”, “Don’t \_\_\_\_\_”
  
12.    **THREAT**  
Def: Any verbal warning (implicit or explicit) of an aversive consequence.  
Examples: “If you leave the room, you won’t get to play with toys”, “Your father will be angry tonight if you don’t behave”, “If you don’t clean up, we can’t get ice cream”, “If you touch the play-doh, you’ll go to time out.”
  
13.    **TIME OUT**  
Def: Child is sent to time out (or similar exclusionary strategy). Time out is coded only once per trip to time out (in the first interval in which time out occurs).
  
14.    **DENYING REQUESTS**  
Def: Parent responds negatively when child asks for an object or a privilege.  
Example: Noncompliance with child commands is also coded here.
  
15.    **CRITICISM**  
Def: Any evaluative statement referring to the child’s prior, ongoing, or future behavior that is negative, states disapproval, or denotes less than average performance.  
Examples: “That’s not how you build it”, “No, it goes the other way”, “That’s not right”, Insults, “Uh-oh” (in response to misbehavior)
  
16.    **NEGATIVE PHYSICAL CONTACT**  
Def: Any forceful or unpleasant physical attention given to the child.  
Examples: Grabbing the child’s arm, Blocking, Holding, Dragging the child, Forcibly taking an object, Physical redirection.
  
17.    **NEGATIVE GESTURES**  
Examples: Snapping, Pointing
  
18.    **NEGATIVE LAUGHTER**  
Def: Parental laughter in response to inappropriate behavior or delivered in a non-humorous context.  
Examples: Parent laughs sarcastically, Parent makes fun of the child.
  
19.    **NEGATIVE OTHER**  
Def: Any verbalization or action not coded elsewhere which is delivered in an obviously negative tone.

20. **RULE REMINDER**

Def. Restatement of a rule during or following a rule violation or attempted rule violation.

Appendix G:  
Informed Consent Form

Department of Psychology  
2810 Old Main Hill  
Logan UT 84322-2810  
Telephone: (435) 797-1460  
Fax: (435) 797-1448

## INFORMED CONSENT

### Altering Positive/Negative Interaction Ratios in Relationships of Mothers and Young Children: A Preliminary Investigation

**Introduction/Purpose:** Under the direction of Dr. Clint Field in the Department of Psychology at Utah State University (USU), Andrew Armstrong is conducting a research study. This study is being conducted to learn more about the interactions between mothers and young children. You have been asked to take part because you have a child in the age range of interest (3-5 years). There will be approximately 8 to 12 total mother/child pair participating in this study.

**Procedures:** If you agree to be in this research study, you and your child will be observed in USU's Psychology Community Clinic for one hour. Your entire participation in the study will be completed during that hour. You and your child will be introduced into a room that has a table and chairs, and several toys. Instructions will be given to have your child play while you complete some questionnaires at the table. Video and audio recordings of the observation will be made for data purposes (these will be kept confidential, and will be destroyed immediately after the data is gathered from the recordings).

Your child will be playing in a carpeted room with various everyday objects, such as toys, table, and chairs. Normal risks associated with play will be present. If any dangerous activity is observed (for example, if a child is climbing on the furniture), parents in the study will be prompted by researchers to help ensure safety by giving instructions, or through gentle physical guidance. Parents will be given instructions not to allow the child to leave the room; researchers will interrupt, ending the observation if the child does leave and resists returning. There is a chance that children may become emotionally reactive during the course of the study. This reaction may include yelling, tantrums, crying, and/or defiance. If the emotional reaction is excessive or prolonged (lasting 10 or more minutes), researchers will discontinue the observation so as to prevent lasting effects on the parent or child. Also, the observation will be ended by researchers if aggressive acts on the part of the parent or child are observed (e.g., hitting, throwing toys at another person, etc.). Further, researchers will interrupt and end the observation if the volume level becomes loud enough that it disturbs neighboring treatment rooms.

**New Findings:** There may not be any direct benefit to you from these procedures. The investigator, however, may learn more about the interactions between parents and young children; which knowledge may benefit other parents in the future. At the conclusion of your participation today, you will receive detailed information about the purposes of this study as well as a summary of information regarding positive interactions, including some tips which may help improve your relationship with your child.

**Risks:** There is minimal risk in participating in this study. Participation in this research study may involve some minor risks or discomforts which have been explained and identified above under "Procedures."

**Explanation & offer to answer questions:** Mr. Armstrong has explained this research study to you and answered your questions. If you have other questions or research-related problems, you may reach Dr. Field at (435) 760-4132.

Department of Psychology  
2810 Old Main Hill  
Logan UT 84322-2810  
Telephone: (435) 797-1460  
Fax: (435) 797-1448

## INFORMED CONSENT

### Altering Positive/Negative Interaction Ratios in Relationships of Mothers and Young Children: A Preliminary Investigation

**Compensation:** You will be compensated \$20.00 for your participation and time in this study. You will be compensated for participating, even if the observation session is cut short or if the data obtained is not ultimately used in the study. There is no cost for you, other than minimal travel costs to USU campus.

**Voluntary nature of participation and right to withdraw without consequence:** Participation in research is entirely voluntary. You may refuse to participate or withdraw at any time without consequence or loss of benefits. You may be withdrawn from this study without your consent by the investigator, for reasons explained above under the "Procedures" section.

**Confidentiality:** Research records will be kept confidential, consistent with federal and state regulations. Only the Mr. Armstrong and Dr. Field will have access to the data which will be kept in a locked file cabinet in a locked room. The video and audio recordings will be destroyed as soon as the information is collected and transcribed. Publications of this research will include no personal, identifiable information. Contact information will immediately be removed from the research data, and will then be destroyed to protect your privacy.

**IRB Approval Statement:** The Institutional Review Board for the protection of human participants at USU has approved this research study. If you have any questions or concerns about your rights, you may contact the IRB at (435) 797-1821.

**Copy of consent:** You have been given two copies of this Informed Consent. Please sign both copies and keep one copy for your files.

### **Investigator Statement**

"I certify that the research study has been explained to the individual, by me or my research staff, and that the individual understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered."

---

Clint Field, Ph.D.  
Principal Investigator  
(435) 760-4132

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Andrew Armstrong, B.S.  
Student Researcher  
(435) 512-6106

**Participant Signature:** By signing below, I agree to participate.

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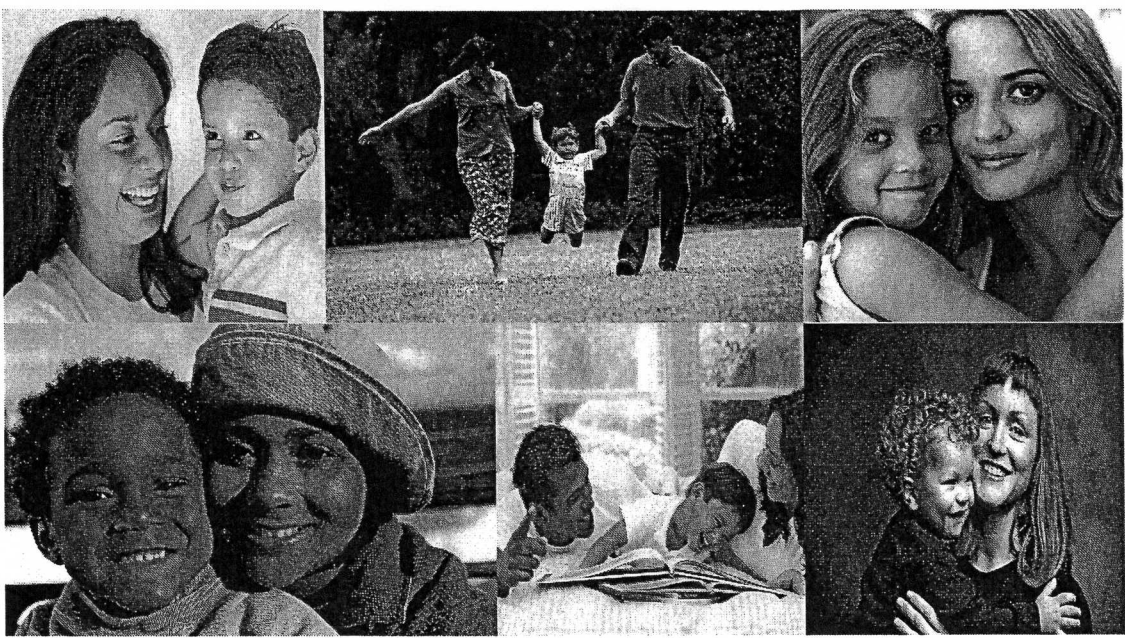
Participant's signature

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Date

Appendix H:  
Recruiting Flier





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## USU Research Study Seeking Participants

### Mothers of young children (3-5 yrs. old) needed

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- Purpose of study is to learn more about how to help mothers increase positive interactions with their kids.
- Participation requires a one-time visit to the USU Psychology Department, lasting one hour.
- Flexible dates and times.
- Volunteers will receive \$20.00 for participating.
- For more information, or to volunteer, please contact Andrew Armstrong at (435) 512-6106.